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A

TRANSLATION

OF THE

NEW LONDON PHARMACOPŒIA,

INCLUDING ALSO

THE NEW DUBLIN AND EDINBURGH PHARMACOPŒIAS,

WITH A FULL ACCOUNT OF THE CHEMICAL AND MEDICINAL
PROPERTIES OF THEIR CONTENTS;

FORMING A

COMPLETE MATERIA MEDICA.

BY

J. BIRKBECK NEVINS, M.D. LOND.
M. R. C. S. AND L. A. C.
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LIVERPOOL:
FORMERLY MEDICAL TUTOR IN GUY'S HOSPITAL.

BIBLIOTHECA BODLEIANA

SECOND EDITION.

LONDON:
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1854.

157. i. 92.

PREFACE

TO

THE SECOND EDITION.

In preparing this second edition, the author has spared no pains to render it worthy of the favourable reception which was bestowed upon the first, both by the introduction of new matter of importance, and by the correction of errors which existed in the work as it was first published. In this part of his duty he has derived assistance from the criticisms of some of the reviews which noticed his labours unfavourably at first; and though he can scarcely hope, that in a work of such extent he has escaped all errors, he trusts that an honest desire, and unwearied exertions to correct them, wherever they could be found, have not been altogether unsuccessful.

The general plan of the work remains much as it was before, but he has altered the arrangement of some of the articles, by bringing together notices which were formerly disunited, by which he hopes to have consulted the convenience of the reader. He has also, with few exceptions, given the formulæ of the three Pharmacopœias separately, instead of incorporating those of Edinburgh and Dublin with the London ones. This has necessarily increased the bulk of the volume, a disadvantage which will, however, be more than compensated by the increased convenience of reference. One point he has retained, which was objected to by the Edinburgh Monthly Review, viz., the addition of the letters *L. D. E.*, in some cases in which no such name as the one under consideration is to be found in the Dublin or Edinburgh Pharmacopœia. For example, Antimonii Potassio Tartras, *L. D. E.* was objected to, because no such name is used in either Dublin or Edinburgh. But his object, in such cases, is to indicate that some such preparation is contained in the Pharmacopœia whose initials are attached, though it may be under a different title; and, as he has always added the name really employed, and the formula given for making the substance, he trusts that no error will arise from this source. It would be useless to attempt the enumeration of all the additions which have swelled the work to its present size; but the most important of them are the articles on Arnica, Bael, Cotyledon, Collodion, Gold, Ferri Pulvis, Manganese, Phyllerine, Quinidine, Santonine, the Sulphites and Sulphurous Acid, Sumbul, Zinci Iodidum, and the Pyrogenic Compounds employed in the treatment of Pulmonary diseases. There is scarcely a page which has not received addition or alteration, and in every part he trusts that improvement will be visible.

In conclusion, he tenders his most grateful acknowledgment to the journals, whose favourable notices of his first essay in the field of medical literature, have proved no feeble stimulus in inciting him to use every exertion to render the present deserving of a continuance of their encouraging support.

25. Oxford Street, Liverpool, August, 1854.

TRANSLATION

OF THE

NEW LONDON PHARMACOPŒIA.

of "Characteristic Effects," is therefore devoted to this point, whenever the substance is of sufficient importance to deserve particular notice; and the student finds under this head in tartar-emetic, that it is "a nauseating, depressing emetic, causing long-continued vomiting, and often acting upon the bowels at the same time, unsuited for aged people or prostrate conditions of the system;" whilst sulphate of zinc causes "little nausea, acts once or twice only, and does not leave any depression." Ipecacuanha "sometimes occasions severe spasmodic asthma, but is generally a safe and efficacious emetic;" whilst squill, "though sometimes acting as one, is so uncertain, that it is never employed with this intention."

On the other hand, he has passed over the botany and zoology of various substances very briefly indeed; in many cases having scarcely alluded to them. He has, however, been careful to mention everything which is necessary for students in preparing for their examinations, and more than this his experience has taught him they never read, even if provided. His object has not been to write a book on natural history, but upon the properties and uses of medicines, to which branch of his subject he has devoted by far the largest proportion of attention, in the hope that not only the student but the practitioner also, may find himself in possession of a complete compendium of the effects and uses of medicines, so far as our present knowledge extends.

For one division of his work he begs indulgence, viz. the section entitled "Leaves, or Roots, &c., for which the matter under consideration may be mistaken." Some of those which he has put down may seem quite out of the question. He can only reply that he has not mentioned anything which he has not known to cause mistake or difficulty; and he would strongly advise the student, whilst engaged upon the subject, to place at the same time on the table before him the different things which may be mistaken; by which plan he will fix them in his memory more effectually than by any other means with which the author is acquainted.

In constructing the chemical diagrams he has generally omitted everything which is not essential for understanding the chemical changes described. The arrows are employed to indicate the nature of the result: when pointing upwards they imply that a volatile product is obtained; and when directed downwards they show that a precipitate is formed.

The arrangement adopted is the same as that of the London Pharmacopœia, the text of which is indicated throughout, by being printed in large type; and the several articles of the Materia Medica have been described in full under one or other of the preparations, the most important of which have been selected as far as possible. Thus the medicinal properties of Opium have been described under the head of Tinctura Opii; and those of Cinchona and its Alkalies, under the title of Quinæ Disulphas, in the "Alkalies." The author has endeavoured to prevent any inconvenience which might arise from this arbitrary mode of arrangement, by making the Index so complete, that every requisite information may at once be found in it.

It is stated in the title page that the work contains the new Dublin and Edinburgh Pharmacopœias: a statement which requires a word of explanation. Every formula requisite for dispensing a prescription contained in either of them has been carefully introduced; and whenever the pharmaceutical directions differ in any important respect from those of the London College, they have been given in full; but when the directions for making certain articles which are never prepared except by the wholesale chemist, differ very slightly from those of the London Pharmacopœia, he has not repeated them, but has contented himself with the London directions. He believes that nothing of any practical importance has been omitted.

The author avails himself of this opportunity to acknowledge his obligation to the valuable works of Christison, Faraday, Neligan, Paris, Pereira, Phillips, Royle, Taylor, and Thompson. He has endeavoured to acknowledge his obligation in each instance, but it is possible that in a work of such extent references may occasionally have been overlooked. He has never intentionally omitted to acknowledge the source from which he has obtained his information.

Liverpool, 1851.

TRANSLATION OF THE PREFACE

TO

THE LONDON PHARMACOPŒIA OF 1851.

As nearly fourteen years have elapsed since we have corrected and improved our Pharmacopœia, there are circumstances which have induced us to undertake the work anew. If we have in any degree benefited the public at large by completing this edition, we must render our thanks for it to our forerunners who have formerly bestowed their labour upon the same work; since we have been stimulated by their example, and instructed by their endeavours. We wish, however, to make a few remarks by way of preface; and this not so much for the purpose of discussing the whole matter of the book, as for distinctly explaining, and if necessary strengthening by argument, whatever new or partially ambiguous matter may exist in it.

In the first place we must remark, that we have referred many drugs to the first part, which formerly were placed in the second; and we thought it would not be inexpedient to enumerate and describe those drugs which are prepared with very great care and accuracy by the wholesale chemists, rather than to explain in what proportion and mode each must be compounded; inasmuch as they so far serve our purpose that there is not the least necessity for their being prepared by ourselves. There are, however, some drugs manufactured for our use by the wholesale chemists, with just as much care as the former, the mode of preparation of which we have nevertheless preferred to explain, as in the case of chloride and bichloride of mercury. We have done so with this view, that no one may be without a formula for preparing remedies of such a kind as are at the same time exceedingly strong (and therefore highly dangerous), and also by no means difficult in their preparation; and this especially lest it should happen that any one might either be unable to obtain those remedies, or might suspect them of being adulterated. But, in truth, though the greatest care and diligence we could possibly bestow have been expended in rightly compounding these and certain other drugs, we do not, nevertheless, deny, that other persons skilled in chemistry may possibly prepare them with less expense, or greater convenience, by another mode. As regards these preparations, when made by others, we have only deemed it requisite that the same tests should be used for examining them which we have laid down for determining the purity of our own; and that these tests should be so far used, that all drugs are to be considered as prohibited, which, so to speak, cannot be weighed in our balance.

We have added certain new medicines, simple as well as compound, because they seem to have approved themselves by a long course of trial. Moreover, if there are any tests which have not been previously described in our Pharmacopœia, but are useful for testing the purity of our materials, we have inserted them along with the other characters, immediately beneath the places where each article seems most appropriately to be placed.

Although the structure of vegetables is so very different from metals that it is more difficult briefly to define and describe those vegetable substances which are useful for medical purposes, than those which are taken from the metals, we have thought, nevertheless, that we should by no means shrink from this more difficult part of our undertaking; especially as it is of the utmost importance to declare with the greatest accuracy what is the meaning of every name in this Pharmacopœia, for fear any ambiguity might remain from different substances being included under the same title.

The names of medicines in every-day use we have been unwilling rashly to change, inasmuch as for the most part they were given by our predecessors either on scientific principles, or because they had the sanction of a certain antiquity of usage. We have not however been ignorant that we ought to include in our nomenclature all the progress which scientific knowledge has made: only care must be taken that in selecting or making titles, we do not take anything as certain and proved which is still doubtful; inasmuch as we ought to keep pace with natural history, rather than outstrip its advance. Be this as it may, we have placed the old names side by side with the new ones, in such a manner that what has been left unchanged may be manifest to every one.

To conclude, we hope it may turn out that our Pharmacopœia, constructed upon these principles, may be seen to contain the observations of past ages and recent research, so far as to be welcome to those already exercising the medical profession, and at the same time to assist youth, by teaching them what materials to employ. We hope also that, for those who make a profit by preparing and selling medicines, it may lay down rules both convenient and distinct, and confirm those which have been already imposed.

THE

LONDON PHARMACOPŒIA.

WEIGHTS, MEASURES, ETC.

As two kinds of weights are used in England, by one of which gold and silver, and by the other nearly all other kinds of merchandise are valued, we employ the former, which is also called TROY WEIGHT; and we divide the pound thus, viz.

The Pound	℔	contains	Twelve Ounces, ℥ xij.
— Ounce	℥	contains	Eight Drachms, ʒ viij.
— Drachm	ʒ	contains	Three Scruples, ℈ iij.
— Scruple	℈	contains	Twenty Grains, gr xx.
— Grain	gr.		

We have affixed the signs by which it is usual to denote each weight.

We use measures of liquids derived from the gallon defined by the laws of the kingdom: this for medicinal purposes we divide thus, viz.

The Gallon	C	contains	Eight Pints, O viij.
— Pint	O	contains	Twenty Fluidounces, f ℥ xx.
— Fluidounce	f ℥	contains	Eight Fluidrachms, f ʒ viij.
— Fluidrachm	f ʒ	contains	Sixty Minims, ♏ lx.
— Minim	♏		

We have affixed the signs by which we denote each measure.

The Dublin College has discarded troy weight, and now employs avoirdupois weight:—

The pound,	℔	=	16 ounces	=	7000	grains.
The ounce,	℥	=	8 drachms	=	437·5	„
The drachm,	ʒ	=	3 scruples	=	54·68	„
The scruple,	℈	=			18·22	„

The difference in weight is so small as to be of trifling importance.

Care is to be taken that medicines do not acquire any impurity from the material of the vessels in which they are either prepared or kept, on which account we wish glass or glazed vessels to be used, unless it is otherwise directed; and we consider those to be properly glazed, which are commonly called *porcelain* or stoneware. But extreme care is to be taken that no vessels are employed which are glazed with lead.

All acid, or alkaline, or metallic preparations, and salts of every kind, ought to be kept in stopped glass bottles. For some preparations it is proper that the glass should be black or green.

Wherever the saturation of acids or alkalies is mentioned, we wish it to be ascertained whether it be perfect or not, by means of litmus and turmeric, in the mode adopted by chemists. But when crystals of carbonate of soda dissolved in water, are added to saturate any acid, it is necessary that all the carbonic acid should be first expelled by the aid of heat. In performing experiments it is necessary to use nothing but distilled water. Unless it is otherwise ordered, white bibulous paper is to be used, both for straining liquids and drying crystals.

When *crucibles* are required, we direct those to be employed which are Hessian or Cornish.

A *water bath* is that by which any substance contained in a proper vessel is exposed either to hot water itself, or to the vapour of boiling water.

A *sand bath* is made of sand, to be gradually heated, in which anything is placed, contained in a proper vessel.

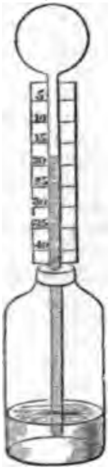
Chloride of Zinc Bath, *D.* — The addition to water of various saline substances raises the temperature requisite for ebullition considerably above that required by pure water. And various saline solutions are accordingly employed, when a uniform temperature somewhat above 212° F. is required. The Dublin College employs a solution of chloride of zinc, as a bath from which some volatile substances are to be distilled which require a higher temperature than 212° F.

Fusible Metal Bath, *E.* — The Ed. Coll. employs a bath made of fusible metal (8 parts tin, 4 lead, 3 bismuth), with a similar intention of obtaining a uniform temperature higher than 212° F. By means of this bath a heat of 320° F. can be maintained steadily.

We measure the degree of heat by Fahrenheit's thermometer. When we direct a boiling heat, we understand that which is marked 212°; but we call that a gentle heat which is marked between 90° and 100°.

Several kinds of thermometer are in common use besides Fahrenheit's, and they are constructed of various materials. The simplest is the Air thermometer, or Sanctorius's (*fig.* 1.); in which air is contained in the bulb, whilst the long tube is immersed in the coloured fluid, by which it is also partly filled. When the air is expanded by heat, the fluid is depressed in the tube. But this form is not convenient; because the expansion of air is so considerable, that the instrument must be very large to admit a range of only a few degrees. The volume of air in the bulb also varies from changes in the atmospheric pressure independent of any change of temperature.

Fig. 1.



The Spirit thermometer is constructed of coloured alcohol contained in a common thermometer tube. As spirit boils at a temperature of 176° F., it cannot be used for measuring high degrees of heat; but it possesses an advantage over all other substances employed, in remaining fluid at the lowest known temperatures. Hence it is used in experiments upon freezing mixtures, and in cold climates in which mercury is often frozen.

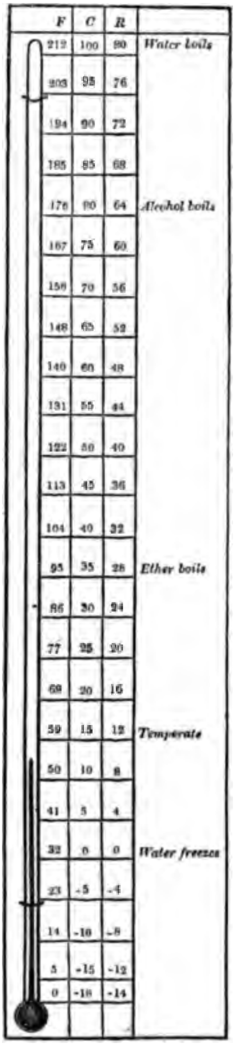
The Mercurial thermometer is the one most commonly employed, and is applicable to a large range of temperature.

Mercury is solid at 40° or 44° below 0° F., and volatilises at 660° or 666° F.; but between these two points it is fluid, and thus has a range of 700°. Its rate of expansion is nearly equable, as high as the temperature of boiling water; in which respect it is superior to all other fluids employed for making thermometers.

Three scales are used, which differ much from one another, viz. Fahrenheit's in England, Centigrade in France, and Reaumur's in Germany and Prussia. In the Centigrade (*fig.* 2 C.) and in Reaumur's scales (*fig.* 2 R.) the freezing point of water is made 0°, whilst in Fahrenheit's (*fig.* 2. F.) 0° is 32° below the freezing point of water. In the Centigrade scale 100° marks the boiling point of water, and in Reaumur's 80° marks the same point, while it is indicated in Fahrenheit's by 212°. Hence between freezing and boiling there are 100° in the C. scale, 80° in the R., and 180° in the F. scale.

Fahrenheit's zero is below the freezing point of water, because he took a mixture of snow and salt, which he believed to produce an entire absence of heat; and he therefore called it zero. He then divided his scale into 212°. If the degrees of one scale are to be reduced into those of another, the 32° below freezing must always be taken into account. On referring to the scale it will be seen that 180° on the F. scale, between freezing and boiling, are equal to 100° C. or to 80° R.; or, on reducing these to smaller numbers, 9° F. will equal 5° C. or 4° R. Let us now find the temperature on the C. scale at which alcohol boils. This point is 176° F.; but this is not 176° above freezing, at which the C. scale commences, but 176° above 0° of F. In order to compare them, we must therefore see how many degrees it is above freezing, which is found by subtracting the 32° below the freezing point. This leaves 144°. Consequently, alcohol boils at 144° F. above the freezing point. If then 9° F. equal 5° C., how many do 144° F. equal?

Fig. 2.



F	C	R	
212	100	80	*Water boils*
203	95	76	
194	90	72	
185	85	68	
176	80	64	*Alcohol boils*
167	75	60	
158	70	56	
148	65	52	
140	60	48	
131	55	44	
122	50	40	
113	45	36	
104	40	32	
95	35	28	*Ether boils*
86	30	24	
77	25	20	
68	20	16	
59	15	12	*Temperate*
50	10	8	
41	5	4	
32	0	0	*Water freezes*
23	-5	-4	
14	-10	-8	
5	-15	-12	
0	-18	-14	

As 9 F. : 5 C. :: 144 F. : 80 C., the temperature on the C. scale.

If it be desired to reduce F. to R. we must proceed in the same way, but 4 must be substituted for 5, because 9° F. equal only 4° R. instead of 5° C. Ether boils at about 98° F., to what does this correspond on R.'s scale? This is, again, not 98° above freezing, but above zero; and to find the number of degrees above freezing we must subtract the 32° below that point. This leaves 66° F. above freezing, at which ether boils. If, then, 9° F. equal 4° R., how many degrees do 66° F. equal?

As 9 F. : 4 R. :: 66° F. 29 R., the temperature on the R. scale.

But if degrees of C. or R. are to be reduced to the F. scale, the 32° must be differently treated. Suppose that a room were to be kept at 15° C., what would this be on the F. scale? Since 5° C. equal 9° F., how many will 15° C. equal?

As 5 C. : 9 F. :: 15 C. : 27 F. But this is 27° above the freezing point; and to find the number on the F. scale to which this corresponds, we must find how many it is above zero, which is done by adding 32° to this number. Hence 27 + 32 = 59°, the temperature on Fahrenheit's scale.

If a chemical process is to be conducted at 32° R, what is this on the F. scale?

4° R. equal 9° F., what do 32° R. equal?

As 4 R. : 9 F. :: 32 R. : 72 F. But this is 72° above freezing. To find how many this is above 0° F. we must add 32°, then 72 + 32 = 104° F. the required temperature.

Rules. — The rules, therefore, when shortly expressed, are as follow: —

To reduce degrees of F. to those of C.—From the given number of degrees subtract 32, multiply the remainder by 5, and divide the product by 9.

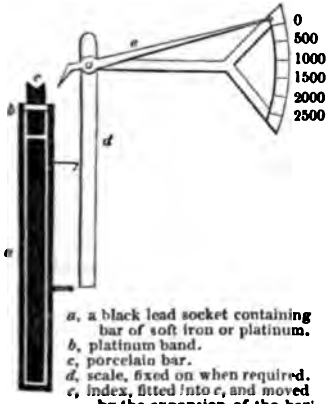
To reduce degrees of F. to those of R.—From the given number of degrees subtract 32°, multiply the remainder by 4, and divide the product by 9.

To reduce degrees of C. to those of F. — Multiply the given number of degrees by 9, divide the product by 5, and add 32° to the quotient

To reduce degrees of R. to those of F. — Multiply the given number of degrees by 9, divide the product by 4, and add 32° to the quotient.

To measure very high temperatures solid instruments are employed, termed pyrometers. Of these the oldest is Wedgwood's, which consists of a graduated wedge of clay, made to pass a certain depth into a groove. When it is heated in a furnace, the clay contracts, owing to the expulsion of moisture, and will then pass further into the groove. The temperature is estimated by the degree of contraction. This is not, however, to be trusted; because it contracts as much if gently heated for a long time as if very much heated for a shorter time.

Fig. 3.



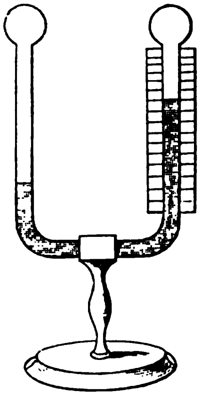
a, a black lead socket containing bar of soft iron or platinum.
b, platinum band.
c, porcelain bar.
d, scale, fixed on when required.
e, index, fitted into *c*, and moved by the expansion of the bar of iron when heated.

Daniel's pyrometer (*fig.* 3.) is now generally used. It consists of a black lead socket in which a bar of soft iron or platinum fits. At the end of this bar is a porcelain rod, which moves stiffly, in consequence of the pressure of a platinum band at the top of the socket. When the instrument is introduced into the furnace, the metallic bar expands, lengthens, and pushes up the porcelain rod. This moves an index, which can be fitted on when the instrument is cold. The porcelain rod is prevented, by the pressure of the platinum band, from slipping down as the bar of metal contracts on cooling.

Leslie's differential thermometer is shown at *fig.* 4. Both the bulbs contain air, and the connecting tube contains some coloured fluid. If any heated body is brought near one bulb, the air expands and depresses the fluid.

This does not indicate an increase of temperature which affects both bulbs equally; for then the air in each expands equally, and there will be no alteration in the height of the fluid.

Fig. 4.



When mention is made of specific gravity, it is meant that the substance spoken of shall be heated to 62°.

The Ed. Coll. directs 60° F. as the proper temperature.

When mention is made of the weight of a precipitate, we mean the material by means of which it is thrown down, to be added in excess, and what is precipitated to be well washed and dried at a heat of 212°, unless otherwise directed. Care must, however, be taken, lest, as sometimes happens, it should be again dissolved, when too much of the precipitating agent is added.

Specific gravity means the *proportion between* the *weight* of any *substance* and that of an *equal bulk* of some other substance taken as a *standard.*

Distilled water is the standard taken for solids and fluids; and atmospheric air, perfectly dry and pure, for gases and vapours. Various modes are necessarily employed to ascertain the specific gravity of these different classes of bodies.

Gases or vapours. — To find the specific gravity of these bodies a globe, made of very thin glass, and capable of containing a known bulk of gas (say 100 cubic inches), is exhausted by means of an air-pump, and carefully weighed. It is then filled with atmospheric air, which has been previously deprived of all moisture by transmission through chloride of calcium, and again weighed. Its weight will have increased by 31 grains. If now the specific gravity of hydrogen is to be found, exhaust the globe a second time, and fill it with dry hydrogen. Its weight is now increased by 2·14 grains. Here the air weighs 31 grains, whilst the *same bulk* of hydrogen weighs only 2·14 grains. As the weight of air is taken as unity, we shall find the specific gravity of hydrogen thus: —

Weight of 100 cub. in. of air.		Weight of 100 cub. in. of hydrogen.		Specific gravity of air.		Specific gravity of hydrogen.
As 31 grs.	:	2·14 grs.	::	1	:	·069

100 cubic inches of oxygen are found to weigh 34·1 grains; its specific gravity is, therefore,

Weight of 100 cub. in. of air		Weight of 100 cub. in. of oxygen.		Specific gravity of air.		Specific gravity of oxygen.
As 31 grs.	:	34·1 grs.	::	1	:	1·1

In all these cases the gas is supposed to be at the temperature of 62° F.

Liquids.—The specific gravity of these substances is found by two different methods; viz. by weighing them, or by the hydrometer.

First. — By weighing them. A *thin* bottle[*] is taken, and carefully weighed when dry. It is then filled with *distilled* water to a mark *a*, and is again weighed. The water is found to weigh—suppose 400 grains. The bottle is to be emptied, carefully dried, and filled to the same mark with the liquid, the specific gravity of which is required.

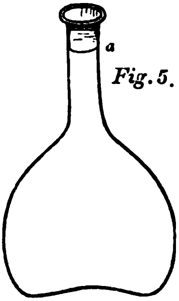


Fig. 5.

Suppose this is found to weigh 380 grains. The *same bulk* of distilled water (which is taken as unity) weighed 400 grains. We then calculate the specific gravity of the fluid in the following manner: —

Weight of the water.		Weight of the *same bulk* of the fluid.		Specific gravity of water.		Specific gravity required.
As 400 grs.	:	380 grs.	::	1	:	0·95

If, instead of weighing 380 grains, it had weighed 600 grains, then,

Weight of water.		Weight of the fluid.		Specific gravity of water.		Specific gravity required.
As 400 grs.	:	600 grs.	::	1	:	1·5

It is more common, however, to use a thin stoppered bottle, which is made to contain exactly 1000 grains of distilled water at 62° F. When this is filled with the liquid under examination, the actual weight gives the specific gravity.

Thus, if filled with rectified spirits, such a bottleful will weigh 838 grains, the specific gravity is therefore ·838.

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[*] Such a bottle may be obtained for one or two shillings from any of the cheap thermometer makers.

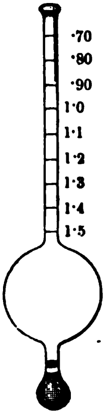
For:—

Weight of the water.		Weight of the fluid.		Specific gravity of water.		Specific gravity required.
As 1000 grs.	:	838 grs.	::	1	:	·838

Sometimes 1000 instead of 1 is taken as the specific gravity of water when liquids are under examination; and then the specific gravity of the spirit would be 838 whole figures, instead of ·838 decimal ones. The London College assumes 1 as the standard, and in it spirit is said to be sp. gr. ·838. The Dublin and Edinburgh Colleges take 1000, and their figures are, therefore, whole ones 838. Nitric acid is sp. gr. 1·42 Ph. L. 1380 to 1390 Ed. and 1500 Dub.

Secondly.—By the hydrometer, *fig.* 6. This is made of glass, and into the lower bulb mercury is introduced, to make the instrument sink, and to keep it upright when in the fluid. The lighter any fluid is, the deeper will the hydrometer sink in it; while the heavier the fluid is, the higher will it float. The quantity of mercury is so adjusted, that when the instrument is put into distilled water it sinks to the mark 1·0. If it is now put into a solution of salt, which is heavier than pure water, it will be more buoyed up, and will not sink lower than 1·1 or 1·2, according to the density of the fluid.

Fig. 6.



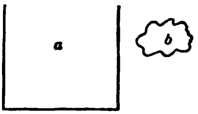
If it be put into alcohol, or proof spirit, which are much lighter than water, it will sink in the first to ·79, or in the second to ·92.

When this instrument is employed for ascertaining the specific gravity of urine, it is called a Urinometer.

The standard temperature for spirit is fixed by the excise laws at 62° F.

Solids.—The specific gravity of these bodies also is found by comparing their weight with that of an *equal bulk* of water. But as their figure is often irregular, the bulk of water which is equal to them cannot be found by putting them into a bottle, as in the case of liquids, and a different method must be adopted. If the vessel *a* were perfectly filled with water, and any irregular solid, *b*, were immersed, it would cause as much water to run over the sides as would be exactly equal to its bulk. This water might be collected and carefully weighed, and the solid body might be taken out and weighed also. Suppose it weighed 32 grains, and the water were found to weigh 16 grains. Here the water weighs 16 grains and the *same bulk* of the solid weighs 32 grains.

Fig. 7.

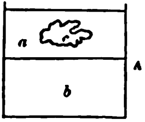


Then, as water is taken as the standard of unity, the specific gravity is thus found:—

Weight of water.		Weight of solid.		Sp. gr. of water.		Sp. gr. of solid.
As 16 grs.	:	32 grs.	::	1	:	2

But this plan is practically inconvenient, for it is difficult to collect the whole of the water that has run over the sides.

Fig. 8.



In the vessel A the upper stratum of water, *a*, is prevented from sinking to the bottom by the upward pressure of the lower layer, *b*, which supports it, or buoys it up. But any irregular-shaped portion, *c*, of this layer is buoyed up just in the same way. Suppose that this irregular portion were to become solid, without in the least altering its weight, it would still be similarly supported. Now, if this portion could be taken out and accurately weighed, and were found to weigh 100 grains, in this case the water surrounding and below it would be supporting a weight of 100 grains. Suppose, however, that, instead of weighing the same as the water, it were a solid weighing twice as much, or 200 grains, the water would still support 100 grains of its weight, but it would sink to the bottom, because 100 grains would be unsupported. Again: if a solid body were found to weigh 80 grains in the air, and were then put into water, and found to weigh, whilst in the water, only 60 grains—in this case the water would be supporting 20 grains of its weight, or the weight of such a bulk of water as is equal to the bulk of the solid. That bulk of water then weighs 20 grains, whilst the same bulk of the solid weighed 80 grains.

Its specific gravity is therefore thus found:—

Weight of water.		Weight of solid.		Specific gravity of water.		Specific gravity of solid required.
As 20 grs.	:	80 grs.	::	1	:	4

This solid body is therefore four times as heavy as the same bulk of water, which is all that is implied by the term specific gravity.

60° F. is the temperature at which the specific gravity of solids is generally taken.

To ascertain in practice the specific gravity of a solid, it must be first suspended by a very fine thread from the bottom of a scale pan, and carefully weighed in the air. It must then be immersed in distilled water, and the loss of weight noted. The original weight in the air is then to be divided by the loss of weight in the water, and the result is the specific gravity required.

Suppose the weight in the air to be 356 grains and the weight in the water 313 grains. The loss is 43 grains. Then, 356 divided by the loss equals 8·279, the specific gravity of the body.

If the solid body is lighter than water, it must still be weighed in the air, as before, and then immersed in the water: as, however, it will not sink, weights must be laid upon the top of it, until it is *just* over head in the water. This weight must be added to that in the air, and the united weight being divided by the weight of the body in the air gives the specific gravity required. Thus, if a piece of wood weighed 76 grains in the air, and 63 grains were placed upon it in the water before it sunk over head, 76+63=139 will equal the weight which the water has buoyed up, that is — the weight of a quantity of water *equal in bulk* to the solid. Then

Weight of water.		Weight of the *same bulk* of wood.		Specific gravity of the water.		Specific gravity of the wood.
As 139 grs.	:	76 grs.	::	1	:	·546

Powders.—To find the specific gravity of powders was an operation of considerable difficulty until I proposed the following plan some years since. (*Med. Gaz.* 1844.) A quantity of air is always contained between the particles of powders, and is retained so firmly as not to escape when put into water. Owing to this circumstance the powder appears to occupy more space than it really does, and the weight, compared with this apparent bulk, is therefore inaccurate.

Take a specific gravity bottle capable of containing, say 1000 grains of water; and, having counterpoised it, introduce the powder. first weighed, and partially fill the bottle with water. Then place the bottle and its contents under the receiver of an air-pump, and exhaust the air. As soon as this is done, the air which was amongst the powder escapes, and is removed by continuing the exhaustion. Then re-admit the air, and fill the bottle with water and weigh it. Suppose it weighs 1050 grains. The powder itself weighed, say 100 grains, and there are therefore in the bottle 950 grains of water. But it is capable of holding 1000 grains of water. The powder, therefore, occupies the space of 50 grains of water.

The weight of the powder is thus easily compared with the weight of an equal bulk of water. (See *Def. of Sp. Gra. p.* 6.) For it weighed 100 grains, and the same bulk of water weighs only 50 grains. Therefore,

Weight of water.		Weight of powder.		Specific gravity of water.		Specific gravity of powder.
As 50 grs.	:	100 grs.	::	1	:	2

The following tables are added, though not contained in the Pharmacopœias: —

TROY, OR APOTHECARIES' WEIGHT.

Pound.		Ounces.		Drachms.		Scruples.		Grains.		Grammes.
1	=	12	=	96	=	288	=	5760	=	372·96
		1	=	8	=	24	=	480	=	31·08
				1	=	3	=	60	=	3·88
						1	=	20	=	1·29
								1	=	·085

AVOIRDUPOIS WEIGHT.

Pound.	Ounces.	Drachms.	Grains.	Grammes.
1 =	16 =	256 =	7000 =	453·26
	1 =	16 =	437·5 =	28·33
		1 =	27·344 =	1·77
			1 =	·065

APOTHECARIES COMPARED WITH AVOIRDUPOIS WEIGHT.

		Ounces.	Drachms.	Grains.	
1 pound (apoth.)	=	13	2	18	Avoirdupois.
1 ounce . .	=	1	1	15	
1 drachm . .	=		2	5	
1 scruple . .	=			20	
1 grain . .	=			1	

AVOIRDUPOIS COMPARED WITH APOTHECARIES WEIGHT.

		℔	℥	ʒ	℈	Gr.	
1 pound (avoird.)	=	1	2	4	2	0	Apothecaries.
1 ounce . .	=			7	0	18	
1 drachm . .	=				1	7·3	
1 grain . .	=					1	

From the above tables it is evident, that the apothecaries pound, ounce, and drachm differ from the avoirdupois weights of the same name. The Dublin College uses avoirdupois weight alone; and therefore, if a Dublin prescription is dispensed in England, the medicine will not correspond exactly with the intentions of the writer. This may occasion a suspicion that a mistake has been made by the dispenser; but it is not probable that any material harm would result from the difference of a seventh in the dose. The tablespoons by which doses are generally measured, vary more than this amongst themselves.

The French gramme is here introduced, as it is frequently met with in the works of the present day. For rough calculations it will suffice to multiply any given number of grammes by 15, to find the corresponding number of grains. The true weight of the gramme is 15·444 grains.

IMPERIAL MEASURE.

Gallon.	Pints.	Fluidounces.	Fluidrachms.	Minims.
1 =	8 =	160 =	1280 =	76800
	1 =	20 =	160 =	9600
		1 =	8 =	480
			1 =	60

Weight of water at 62°.		Avoir. lb.	oz.		Grains.		Cubic inches.
Imperial gallon . .	=	10	0	=	70000	=	277·274
Imperial pint . .	=	1	4	=	8750	=	34·659
Imperial fluidounce .	=	0	1	=	437·5	=	1·733
Imperial fluidrachm .	=				54·7	=	0·216
Imperial minim . .	=				·91	=	0·004

IMPERIAL COMPARED WITH WINE MEASURE.

		Gallon.	Pint.	Fluidoz.	Fluidrach.	Minims.	
Gallon (imp.)	=	1	1	9	5	3	Wine.
Pint . .	=		1	3	1	35	
Fluidounce .	=				7	38	
Fluidrachm .	=					58	
Minim .	=					0·96	

WINE COMPARED WITH IMPERIAL MEASURE.

		Pints.	Fluidoz.	Fluidrach.	Minims.	
Gallon (wine)	=	6	13	2	22	Imp.
Pint . .	=		16	5	17	
Fluidounce .	=		1	0	19	
Fluidrachm .	=			1	2·5	
Minim .	=				1·04	

One cubic inch of water at 62° F. weighs 252·458 grains.

It has become of late so much the fashion to use French measures as well as French weights, that the following tables have been introduced:—

FRENCH MEASURES OF LENGTH.

		English Inches.		Miles.	Fur.	Yards.	Feet.	Inches.*
Millimetre	=	·0393						
Centimetre	=	·3937						
Decimetre	=	3·9371						
Metre	=	39·3710	=	0	0	1	0	3·37
Decametre	=	393·7100	=	0	0	10	2	9·7
Hecatometre	=	3937·1000	=	0	0	109	1	1
Kilometre	=	39371·0000	=	0	4	213	1	10
Myriametre	=	393710·0000	=	6	1	156	0	4

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* It is interesting to notice the close correspondence between the French standard of measure (the Metre) and our own, which is the length of a pendulum vibrating seconds, in the latitude of London, on the level of the sea, in vacuo, at 62° F. This is determined by Captain Kater to be 39·1393 inches, differing only about ¼ of an inch from the French standard, which was obtained by accurately measuring the length of a quarter of the globe, and taking the ten millionth part of this as their metre.

FRENCH MEASURES OF CAPACITY.

						Imperial.		
		English Cubic In.		Tons.	Hog.	Gal.	Pt.	Oz
Millilitre	=	·06103	=					·035
Centilitre	=	·61028	=					·35
Decilitre	=	6·10280	=					3·52
Litre	=	61·02800	=				1	15·2
Decalitre	=	610·28000	=			2	1	12
Hecatolitre	=	6102·80000	=			22	0	0
Kilolitre	=	61028·00000	=	1	0	10	0	12·8
Myrialitre	=	610280·00000	=	10	2	5	6	14·4

PART I.

MATERIA MEDICA

EMBRACING animal, vegetable, and chemical bodies, which we direct to be employed, either in the cure of diseases, or in the preparation of medicines; whether they are produced naturally, or are prepared in the chemical laboratory, or are sold wholesale in other places.

Remarks. — The pharmacopœia is divided into two principal sections: —

1st. The *Materia Medica.* 2nd. The *Preparations.*

In the first section are placed such substances as are employed in their natural state, or are made on a large scale for commercial purposes: e. g. roots and barks, which are produced naturally, and alum and sulphate of magnesia, which are only made by the wholesale chemists. In the second section are placed all the Preparations made from them. Thus, Cinchona bark is placed in the first section, or the Materia Medica, because it is simply the rough material from which various medicinal preparations are to be made; but infusion of Cinchona is placed in the second, or the Preparations, because it is a definite preparation ordered by the pharmacopœia. Alum and common sulphate of iron are placed in the Materia Medica, for they are manufactured wholesale for other than simply medicinal purposes; but burnt alum and purified sulphate of iron are placed in the Preparations, because they are to be prepared in a special manner prescribed in the pharmacopœia; for though the commercial article is the substance from which the purified sulphate is prepared, it is not pure enough for medicinal purposes. It is, therefore, placed in the Materia Medica, and the purified sulphate in the Preparations. In former editions of the Pharmacopœia, the College placed several substances amongst the Preparations, which it has now removed into the Materia Medica: e. g. disulphate of quinine and the salts of morphia; because they can be obtained wholesale by several different processes, and it is immaterial which is employed, if only the substance is pure when it is obtained. The College, therefore, puts these substances amongst the wholesale materials contained in the Materia Medica; but it places the liquor morphiæ acetatis, and the tinctura quinæ composita, amongst the Preparations, because they are to be of a definite strength, which is not left to the option of the dispensing druggist.

On the Collection and Preservation of Vegetables.

Vegetable substances are to be collected in a dry season, when moistened neither by showers nor dew. They should be gathered annually, and not kept beyond a year.

Most *Roots* and *Rhizomes* are to be dug up when the leaves and old stems have fallen off, and before the new ones are put forth.

Barks ought to be collected at that season in which they can most easily be separated from the wood.

Herbs and *Leaves* are to be gathered after the flowers have blown, and before the seeds have ripened.

Flowers are to be plucked when freshly blown.

Fruits and *Seeds* are to be collected when ripe.

Keep the parts of vegetables dry for use, unless otherwise directed. Those which you wish to dry, place soon after being gathered, in very shallow wicker trays, in a gentle heat in a current of air, light being excluded; then as the moisture evaporates, increase the heat gently to 150°, that they may be thoroughly dried. Lastly, keep the more delicate parts—viz. the flowers and leaves, in black glass vessels well stoppered, and the others in suitable vessels, so that access of light and moisture may be excluded from them.

CATALOGUE OF

In the first row are placed short names of the articles, such for the most
scriptions. In the second, unless otherwise stated, the names of animals are
Chemical substances are designated by their more modern names.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Absinthium Wormwood.	Artemisia absinthium The flowering plant.	Compositæ, or Synantheraceæ.	Syngenesia
Acacia Gum arabic.	Various species of acacia. Gum exuded from the bark, and dried in the air.	Leguminosæ Sub. Ord. Mimoseæ.	Polygamia
Acetum Britannicum British Vinegar.	Acetic acid (impure and diluted, prepared by fermentation from infusion of malt).	- -	- -
Acetum Destillatum, *E.*	- - -	- -	- -
Acetum Gallicum, *E.* & *D.* French vinegar.	- - -	- -	- -
Acidum Aceticum Acetic acid (of commerce, sp. gr. 1048, *L.*; 1068, *E.*; 1044, *D.*)	Acid prepared from wood by fire, and purified.	- -	- -
Acidum Arseniosum Arsenious acid.	A metallic acid, prepared by sublimation.	- - -	- -
Acidum Benzoicum Benzoic acid.	Acid prepared by sublimation from Benzoin. Crystals.	- -	- -
Acidum Citricum Citric acid.	Citrus Limonum, and other species. An acid prepared from the juice of the fruit. Crystals.	- -	- -
Acidum Gallicum Gallic acid.	Acid prepared from galls. Crystals.	- -	- -
Acidum Hydrochloricum. Hydrochloric acid, sp. gr. 1·16, *L.*; 1·18, *E.*	Acid prepared from chloride of sodium (common salt).	- -	- -
Acidum Nitricum Nitric acid, sp. gr. 1·42, *L.*; 1·38 to 1·39, *E.*	Acid prepared from nitrate of potash (saltpetre).	- -	- -

MATERIA MEDICA.

part as are simple and in common use, and suitable for the formulæ of pre-
quoted, as used by Cuvier, and of vegetables by Linnæus or De Candolle.

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Polygamia superflua.	Indigenous -	Arom., bitter, tonic, anthelmintic.	Vol. oil, extractive.	None officinal, an ext. is kept.
Monœcia -	Arabia - -	Demulcent -	Arabin -	Conf. amyg., Mist. acac., M. cret., M. guiac., Pulv. cret. co., P. trag. co.
- -	- -	Refrigerant.		
- -	- -	Refrigerant.		
- -	- -	Refrigerant -	- -	(Syrup aceti, *E.*).
- -	- -	Refrigerant and caustic.		
- -	- -	Violent acrid poison. Tonic.	- -	Liq. potas. arsen. Liq. Arsen. chl. Liq. arsen. et hydrarg. hydroid. *D.*
- -	- -	Expectorant -	- -	Tr. Camph. co. Tr. op. camph. *D. E.*
- -	- -	Refrigerant -	- -	Pulv. eff. cit. *D.* Syrup, *D.*
- -	- -	Astringent.		
- -	- -	Refrigerant -	- -	Acid. hydrochl. dil.
- -	- -	Refrigerant and caustic.	- -	Acid. nitric. dil.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Acidum Pyrolignenm, *E.* Pyroligneous acid, sp. gr. 1034, Acid Acetic.			
Acidum Sulphuricum - Sulphuric acid (oil of vitriol), sp. gr. 1·843, *L.*; 1·84, *E.*	Acid prepared from sulphur.	- -	- -
Acidum Tannicum - Tannic acid.	Acid prepared from galls	- -	- -
Acidum Tartaricum - Tartaric acid.	Acid prepared from bitartrate of potash (cream of tartar) Crystals.	- -	- -
Aconiti folium - - Aconite leaves. Monkshood.	Aconitum Napellus - Fresh and dried leaves.	Ranunculaceæ -	Polyandria -
Aconiti radix - - Aconite root.	The root - - -	”	”
Adeps - - - Lard (hog's).	Sus scrofa - - The fat prepared.	- -	- -
Ærugo - - - Verdigris.	Diacetate of copper -	- -	- -
Æther (Æth. sulphuricus, *Ph. L.* 1836). Æther, sp. gr. ·75, *L.*; ·735, *E.*	Æther prepared from Alcohol by the aid of sulphuric acid.	- -	- -
Alcohol, *E.* - - - Alcohol.	Absolute alcohol, sp. gr. 794·6.	- -	- -
Allium, *E.* - - - Garlic.	Allium sativum - - The bulb.	Liliaceæ - -	Hexandria - -
Aloe Barbadensis - - Barbadoes aloes.	Aloe vulgaris - - The inspissated juice of the cut leaf.	”	”
Aloe Hepatica - - Hepatic aloes.	Uncertain species of aloe. Inspissated juice of the leaf?	”	”
Aloe Indica, *E.* - - East Indian Aloes.	Ditto.	”	”
Aloe Socotrina - - Socotrine aloes. (Aloe, *Ph.* 1836).	Uncertain species of aloe. Juice of the cut leaf, hardened in the air.	”	”
Althæa - - - Marshmallow.	Althæa officinalis - - The root (and leaves, *E.*)	Malvaceæ -	Monadelphia -
Alumen - - - Alum.	Sulphate of Alumina and potash. Crystalline.	- -	- -

Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	- -	Refrigerant and caustic.	- -	Acid. Sulph. Arom.
- -	- -	Astringent.		
- -	- -	Refrigerant -	- -	Pulv. Efferv. *E.* P. Efferv. Tart. *D.*
gynia -	Indigenous? -	Causes local numbness.	Aconitine -	Ext.
"	"	"	"	Tinct.
-	- -	Emollient -	- -	Various ointments.
-	France - -	Tonic, emetic -	- -	Lin. Æruginis. Emp. Canth. co. *E.* Ung. Cup. subacet. *D.*
-	- -	Stimulant -	- -	Sp. Æth. co. Tr. Erg. Æth. Tr. Lob. Æth.
-	- -	"	- -	Spirits and Tinctures.
gynia -	Indigenous -	Irritant, stimulant	Acrid vol. oil -	None.
"	Barbadoes -	Purgative, emmenagogue.	Aloësin and Resin.	Dec. al. co. Enema al. Ext. al. Ext. al. aquos. Pil. al. co. Pil. al. et assaf.
"	East Indies -	"	"	Pil. al. et ferri. Pil. al. et myrrh. Pil. al. c. sapon.
-	"	"	"	Pil. camb. co. Pil. coloc. co. Pil. coloc. et hyos. Pil. rhei co.
"	Socotra -	"	- -	Pulv. al. co., Tinct. al. Tinct. al. co., Tinct. al. et myrrh, Tr. Benz. co. Tr. rhei et al. Vin. aloes.
ndria -	Indigenous -	Demulcent -	Mucilage -	Mist. *E.* Syrup.
- -	- -	Astringent -	- -	Liq. al. co. Pul. al. co. *E.*

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Ammoniacum - - Ammoniacum.	Dorema ammoniacum, (Don). Gum-resin exuding from the stem and stalks, hardened in the air.	Umbelliferæ -	Pentandria -
Ammoniæ Carbonas, *E. D.* Carbonate or sesquicarbonate of ammonia.	Ammoniæ sesquicarbonas -	- -	- -
Ammonia Hydrochloras. Hydrochlorate of ammonia (sal ammoniac)	Ammoniæ hydrochloras Crystalline.	- -	- -
Ammoniæ Liquor, sp. gr. ·96. Solution of ammonia.	- - -	- -	- -
Ammoniæ Liquor fortior. Strong solution of ammonia, sp. gr. ·882.	- - -	- -	- -
Ammoniæ Sesquicarbonas Carbonate or sesquicarbonate of ammonia.	Ammoniæ sesquicarbonas. Crystalline.	- -	- -
Ammoniæ spiritus, *E.* - - Spirit of ammonia.	- - -	- -	- -
Amy'gdala amara, *E.* Bitter Almonds.	Amygdalus communis (var. a. De Candolle). The kernels.	Amygdaleæ -	Icosandria -
Amy'gdala (Jordanica), (dulcis, *Ph.* 1836.) Jordan (sweet) almond.	Amyg. commun. (var. dulcis). The kernels.	"	"
Amy'gdalæ oleum - Oil of almonds.	Amyg. com. (var. bitter and sweet). The oil expressed from the kernels of either.	"	"
Amy'lum - - - Starch.	Triticum vulgare (Villars). The fæcula of the seeds.	Gramineæ -	Triandria -
Ane'thum - - - Dill.	Anethum graveolens - The fruit.	Umbelliferæ -	Pentandria -
Anethi oleum - - Oil of dill.	The oil distilled from the fruit.	"	"
Angelica, *E.* - - - Archangel.	Angelica Archangelica - The root	"	"
Anisum - - - Anise.	Pimpinella anisum - The fruit.	"	"
Anisi oleum - - Oil of anise.	The oil distilled from the fruit.	"	"
Anthemis - - - Chamomile.	Anthemis nobilis - The flowers (single).	Compositæ - Corymbiferæ.	Syngenesia -
Anthemidis oleum, (Anglicum). Oil of chamomile, (Eng.).	The oil distilled from the flowers.	"	"

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Digynia -	Persia - -	Stim., expect., emmen.	Resin - -	Empl. am., Emp. am. et hydrarg., Mist., Pil. ipecac. et scil., Pil. scil. co.
- -	- -	Stimulant, diaph., emet.	- -	Lin. Sp. am. arom., Sp. am. fœtid.
- -	- -	Refrig., alterative.		
- -	- -	Stim., rubefac., antacid.	- -	Lin., Lin. hydr. et Lin. co.
- -	- -	Caustic, rubefac.	- -	Lin. am. co., Lin. camp. co., Sp. am. arom. *D.*, Sp. am. fœtid. *D.*, Tr. am. co.
- -	- -	Stim., diaph., emet.	- -	Liq. am. sesq. Lin. am. sesq.
- -	- -	Stimulant.		
Monogynia -	South of Europe -	Sedative - -	Amygdalin and emulsin.	
,,	,,	Demulcent -	Emulsin -	Conf. et Mist., et Mist. acaciæ. et Mist. camph. *E.*
,,	,,	Emol., purg.		
Digynia -	Cultivated -	Nutritive, demul.	- -	Decoct., Enema opii.
Digynia -	Indigenous -	Aromatic -	Vol. oil -	Aqua.
,,	,,	,,		
,,	,,	Aromatic, tonic	Vol. oil.	
,,	Egypt, Spain -	Carminative -	,,	
,,	,,	,,	- -	Sp. anisi (Ess. *D.*), Tr. camph. co.
Polygamia superflua.	Indigenous -	Emetic, stomachic.	Vol. oil, tannin.	(Ext. *E.*), Inf.
,,	,,	Stim., carm.		

Names for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Antimonii oxydum, *E.* Sesquioxide of antimony.	- - -	- -	- -
Antimonii sulphuretum, *E.* Sulphuret of antimony. See antim., tersulph.	- - -	- -	"
Antimonii sulphuretum aureum, *E.* Golden sulphuret of antimony.	- - -	- -	- -
Antimonii Tersulphuretum, (sesquisulphuretum, *Ph.* 1836). Tersulphuret (sesquisulph. of antimony).	- - -	- -	- -
Aqua distillata Distilled water.	- - -	- -	- -
Argentum, *D. E.* Silver.			
Argenti Nitras Nitrate of silver.	Argenti nitras Fused.	- -	- -
Arnica	Arnica Montana	Compositæ Corymbiferæ.	Syngenesia
Armoracia Horseradish.	Cochlearia armoracia The fresh root.	Cruciferæ	Tetradynamia
Assafœtida Assafœtida.	Narthex (ferula) assafœtida (Falconer). The gum-resin exuded from the sliced root.	Umbelliferæ	Pentandria
Atropia Atropia.	Atropa belladona Alkali prepared from the root. Crystals.	Solanaceæ	Pentandria
Avena Groats.	Avena sativa The seeds freed from the husks.	Gramineæ	Triandria
Aurantii cortex Orange peel.	Citrus bigaradia (Risso). The outer rind of the fruit. To be dried in Feb. March, or April.	Aurantiaceæ	Polyadelphia
Aurantii floris aqua Orange water.	Citrus bigaradia (Risso), and C. aurantium (De Candolle). Water distilled from the flower.	"	"
Aurantii oleum, *E.* Oil of neroli.	The oil distilled from the flowers of C. vulg. and C. aur.	"	"
Axungia, *D. E.* Hog's lard.	Sus scrofa Prepared fat.	- -	- -
Bael, Bale, or Belm Not officinal.	Ægle marmelos or Cratæva marmelos. The unripe fruit.	Aurantiaceæ	- -
Balsamum Canadense, *E* Canada balsam.	Abies balsamea Fluid resinous exudation.	Coniferæ	Monœci

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	- -	Diaph., emet.		
- -	- -	Not used medicinally.	-	
- -	- -	Diaph. alterative.		
- -	- -	Not used medicinally.		
- -	- -	Inert vehicle.		
- -	- -	Caustic, tonic.		
Polygamia Superflua. -	- -	Acrid stim. -	Vol. oil Arnicina -	Tinct. (not off.)
Siliculosa -	Indigenous -	Acrid stim., sialag.	Vol. oil -	Inf. ar. co., Sp. ar. co.
Digynia -	Persia - -	Stim., em., antispasmodic.	Vol. oil, resin	Emp. ass. *E.* Enema, P. galb. co., Sp. am. fœtid., Tinct. assaf.
Monogynia -	Indigenous -	Acrid narcotic	- -	Atrop. sulph.
Digynia -	Cultivated in England.	Demulcent -	Starch, gluten.	
Polyandria -	South of Europe.	Arom., bitter tonic.	Vol. oil -	Conf., Inf., Inf. gent. co., Sp. am. co., Syr., Tinct., Tr. cinch. co., Tr. gent. co.
„	France -	Aromatic -	Vol. oil, acetic acid.	
„	„	„		
- -	- -	Emollient.		
- -	Bombay -	Astringent -	Tannin. Ess. oil mucilage.	Confection, Decoct.
Monadelphia -	Canada - -	Stimulant - -	Vol. oil, balsam.	

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Balsamum Peruvianum Peruvian balsam.	Myrospermi (myroxyli). Species uncertain. The balsam which oozes from the cut trunk.	Leguminosæ Papilionaceæ.	Decandria
Balsamum Tolutanum Tolu balsam.	Myrospermum toluiferum. Solidified balsam, which has oozed from the cut trunk.	„	„
Barytæ Carbonas, *E. D.* Carbonate of barytes. Witherite.	- - -	- -	- -
Barytæ Murias, *E.* Muriate of barytes.	- - -	- -	- -
Barytæ Sulphas, *D. E.* Sulphate of barytes. Heavy spar.	- - -	- -	- -
Beheerina (not officinal) Bebeerine.	Nectandra Rodiei Bebeeru, or green-heart. The bark.	Lauraceæ	Dodecandria
Belladonna Deadly nightshade.	Atropa belladonna The leaves, fresh and dried.	Solanaceæ	Pentandria
Benzöinum Benzoin.	Styrax benzoin The balsam, which oozes from the cut bark, dried in the air.	Styraceæ	Decandria
Bergamotæ oleum, *E.* Oil of Bergamot.	Citrus Limetta (Risso) The oil distilled from the rind of the fruit.	Aurantiaceæ	Polyadelphia
Bismuthum. Bismuth. Sp. gr 9·8.			
Borax Borax.	Sodæ bibóras Biborate of soda.	- -	- -
Buchu (Diosma, *Ph.* 1836). Buchu.	Barosma serratifolia (Willd.), B. crenulata (W.), and B. crenata (Eckl.). The leaves.	Rutaceæ	Pentandria
Cajupûti Cajuput.	Melaleuca minor The oil distilled from the leaves.	Myrtaceæ	Polyadelphia
Calamina præparata Prepared calamine.	Zinci carbonas Native, burnt, ground to a very fine powder, and levigated.	- -	- -
Calamus aromaticus, *E.* Sweet flag.	Acorus calamus The Rhizome.	Acoraceæ	Hexandria
Calcii chloridum Chloride of calcium.	- - -	- -	- -
Calumba Calumba.	Cocculus palmatus The root.	Menispermaceæ	Diœcia
Calx Lime. (Quicklime.)	Lime, freshly prepared from *chalk*.	- -	- -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Monogynia	Peru	Stim., and expect.	Cinnamomic acid.	
,,	Carthagena	,,	,,	Syrup., Tinct. benz. co., Tinct. tolut.
- -	- -	Not used medicinally.		
- -	-	,,	- -	Liq. Barii Chlor. *D.* Sol. Bar. Muri. *E.*
- -	- -	,,		
Monogynia	British Guiana	Antiperiodic, tonic	Alk. (Beberine)	Beberinæ Sulph.
,,	Indigenous	Acrid narcotic	Atropia	Emp., Ext., Tinct., Ung.
,,	Sumatra, Java	Stim., expect.	Benzoic acid	Tinct. benz. co.
Polyandria	South of Europe	Perfume.		
- -	- -	Detergent, emmenagogue ?	- -	Mel.
Monogynia	Cape of Good Hope.	Arom., tonic in urinary diseases.	Vol. oil, bitter extract.	Infus. (Tinct. *D. E.*)
Icosandria	Moluccas	Stim., sudorific, antispasmodic.		
- -	- -	Absorbent	- -	Ceratum.
Monogynia	Indigenous	Arom., tonic	Vol. oil, resin ext.	None officinal.
- -	- -	Alterative, deobstruent.	- -	Calc. Chlor. Liq. *D.* Calc. Muri. Sol. *E.*
Hexandria	Shores of the Mozambique.	Arom., tonic	Vol. oil, calumbin. *No* tannin.	Infus., Tinct. Mist. ferri arom. *D.*
- -	- -	Caustic, deodorizing.	- -	Linim. Liquor.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Calx chlorinata - - Chlorinated lime.	- - -	- -	- -
Cambogia - - - Gamboge.	Garceniæ (undetermined species). The gum-resin.	Guttiferæ -	Monœcia -
Camphora - - Camphor.	Camphora officinarum (Nees). (Laurus camphora), a concrete substance, prepared from the wood by heat, and purified.	Lauraceæ -	Enneandria -
Canella - Canella.	Canella alba - - The bark.	Guttiferæ -	Dodecandria -
Canna, *D. E.* - - Tous-les-mois.	Canna edulis ? Fecula of the root.	Marantaceæ -	Monandria -
Cannabis, *D.* - - Indian hemp.	Cannabis Indica - - The extract.	Urticaceæ - -	Diœcia - -
Cantharis - - Spanish fly.	Cantharis vesícatoria - Latreille.	- -	- -
Capsicum (Guineense) Capsicum, cayenne pepper.	Capsicum fastigiatum - (Blume) The fruit.	Solanaceæ -	Pentandria -
Carbo (carbo ligni, *Ph.* 1836). Wood charcoal.	Charcoal, prepared from wood by fire.	- -	- -
Carbo animalis - - Animal charcoal. Ivory black, *D.*	Charcoal prepared from ox blood (and flesh and bones) by fire.		
Carbo animalis purificatus, *E.* Purified animal charcoal. Purified ivory black.			
Cardamómum - - Cardamoms.	Elettaria cardamomum (Maton) (Alpinia Card. Roxb.) The seeds.	Zingiberaceæ -	Monandria -
Carota (dauci radix, *Ph.* 1836). Carrots.	Daucus carota (var. sativa) The fresh root.	Umbelliferæ -	Pentandria -
Carui - - - Caraway.	Carum carui - - The fruit.	,,	,,
Carui oleum - - Oil of caraway.	Oil distilled from the fruit.	,,	,,
Caryophyllum - - Cloves.	Caryophyllus aromaticus. The (dried) undeveloped flowers.	Myrtaceæ -	Icosandria -
Caryophylli oleum - Oil of cloves.	The oil distilled from the undeveloped flowers.	,,	,,

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	- -	Deodorizing -	- -	Liquor, *D.*
Monadelphia -	Siam - -	Hydragogue, cathartic.	Gambogic acid (Resin).	Pil. camb. co.
Monogynia -	East Indies, Japan, & China.	Anodyne? stim.?	- -	Mist., Cer. plum. co., Lin. am. co., Lin. et co. et Lin hydr., Lin. sap. Lin. tereb., L. opii, *E.* Sph. Camph., Tr. Camph., Tr. Campb. co., Tr. Op. Camph. *E.*
Monogynia -	West Indies -	Arom., tonic, and stim.	Vol. oil, bitter extract.	Vin. aloes, Vin. gent. *E.*, Vin. rhei, *D. E.*
Monogynia -	„	Nutritive - -	Starch.	
Pentandria -	East Indies -	Intoxicating, hypnotic, antispasmodic.	Resin - -	Ext. and Tincture, *D.*
- -	Spain and Italy	Vesicant -	Cantharidin -	Cerat., Empl., Empl., C. co. Tinct., Ung. Lin. *D.*
Monogynia -	S. America and Africa and West Indies.	Stim., acrid -	Capsicin (acrid oil.) - -	Tinct.
- -	- -	- -	- -	Cataplasm.
Monogynia -	Malabar and East Indies.	Arom., stim. -	Vol. oil -	Conf. arom., P. coloc. co. Pul. arom. *E.* Pul. cin. co., Tr. card. co., Tr. cin. co., Tr. sen. co.
Digynia -	Indigenous -	Stimulant -	Vol. oil -	Cataplasm not off.
„	South of England.	Aromatic -	Vol. oil -	Conf. opii, Con. rutæ, Emp. cumini, Sp. Car. Sp. Jun. co. *D. E.*
„	„	„	- -	Con. scam. Ess. *D.* P. al. co., P. rhei. co., Sp. carui, Sp. Jun. co.
Monogynia -	Molucca islands	Arom., stim. -	Vol. oil, Caryophyllin. Tannin.	Conf. arom., C. scam., Inf. aurant. co., Inf. car., Sp. am. arom. Sp. lav. co. *E.*, Vin. opii. Mist. ferri arom. *D.*
„	„	„		

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Cascarilla Cascarilla.	Croton eleuteria (Swartz.) The bark.	Euphorbiaceæ	Monœcia
Cassia Cassia.	Cassia fistula The fruit.	Leguminosæ Cæsalpineæ.	Decandria
Cassiæ cortex, *E.* Cassia bark.	Cinnamomum cassia The bark.	Lauraceæ	Enneandria
Cassiæ oleum Oil of cassia.	The volatile oil of the bark.	„	„
Castóreum Castor.	Castor fiber The follicles of the prepuce, filled with a peculiar secretion.	- -	- -
Catechu Catechu.	Acacia catechu Extract from the inner wood, or	Leguminosæ Mimoseæ.	Polygamia
	Uncaria gambir Extract from the leaves.	Cinchonaceæ	
Centaurium, *E.* Centaury.	Erythræa centaurium The flowering heads.	Gentianaceæ	Pentandria
Cera (cera flava, *D. E.*) Wax.	Apis mellifica Prepared honeycomb.	- -	- -
Cera alba White wax.	The same bleached.		
Cerevisiæ fermentum Yeast or barm.	- - -	- -	- -
Cetaceum Spermaceti.	Physeter macrocephalus A concrete prepared from the oily matter in the head.	- -	- -
Cetraria Iceland moss.	Cetraria Islandica (Achar.)	Lichenes	Cryptogamia
Chimaphila Pyrola, or winter green.	Chimaphila umbellata (C. corymbosa, Pursh). The plant.	Pyrolaceæ	Decandria
Chiretta, *E. D.* Chiretta.	Agathotes chirayta Herb and root.	Gentianaceæ	Pentandria
Chlorinei aqua, *E.* Chlorine water.			
Cinchona cinerea, *E.* Gray bark, Silver bark.	Cinchona micrantha The bark.	Cinchonaceæ	Pentandria
Cinchona coronæ, *E.* Crown bark. See Cinch. Pallida.	Cinchona Condaminea	- -	- -
Cinchona flava (regia) (C. cordifolia, *Ph.* 1836). Yellow bark.	Cinchona calisaya (Weddell) the bark.	- -	- -
Cinchona pallida (de Loxa) (C. lancifolia, *Ph.* 1836). Pale or quill bark.	C. Condaminea (Wed.) The bark.	„	„

Linnæan Order.	Whence obtained.	Properties.	Active Princi ple.	Preparations.
Monadelphia -	Bahama islands	Arom., bitter, not astrin.	Vol. oil, Bitter resin, Cascarillina.	Inf., Tinct.
Monogynia -	East and West Indies.	Mild, griping, laxative.	Sugar and gum	Conf. cas., Con. sennæ.
„	Ceylon and Java -	Arom., stim., and astringent.	Vol. oil, tannin -	Tinct. Aq. Sp. *E.* -
„	„	Arom., stimulant, antispasmodic.		
- -	Hudson's Bay, Canada, and Russia.	Antispasmodic	Vol. oil, and resin.	Tinct. Tr. cast. am. *E.*
Monœcia -	East Indies and Jamaica.	Astringent -	Catechine and tannic acid.	Elect. cat. *E.* Inf., cat. co., Tr. cat. co. Pul. cat. co. *D.*
- -	Malacca -	„		
Monogynia -	Indigenous -	Febrifuge, and pure bitter.	Bitter extractive -	None.
- -	America and Africa.	Emollient -	- -	Cerates.
- -	- -	Stimulant -	- -	Catapl. fermenti.
- -	Davis' Straits -	Emollient -	- -	Cerat. and Ung.
Lichenes -	Iceland and Norway.	Bitter, demulcent, tonic, not astring.	Starch, cetrarin (bitter prin.).	Decoct.
Monogynia -	North America	Diuretic, tonic	Bitter ext. resin	Decoctum.
Monogynia -	East Indies -	Bitter, tonic, stomachic.	Bitter ext. -	Inf. *D. E.*, Tinct. *D.*
Monogynia -	Peru - -	Febrifuge, tonic -	Cinchonia.	
„	„	„	„	
- -	- -	- -	Quina -	Dec., Ext., Inf., et Inf. cin. spissat., Tinct.
„	„	„	Cinchonia -	Dec., Ext., Inf., et Inf. cin. pal. spissat., Tr. cinch. co., Tr. cinch. pal., Mist. fer. arom. *D.*

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Cinchona rubra (C. oblongifolia, *Ph.* 1836). Red bark.	Cinchonæ (undetermined species.) The bark.	Cinchonaceæ	Pentandria
Cinnabaris, *E.* Cinnabar or vermilion.	Hydrargyri bisulphuretum	- -	- -
Cinnamomi oleum Oil of cinnamon.	The oil distilled from the bark.	Lauraceæ	Enneandria
Cinnamomum Cinnamon.	Cinnamomum, Zeylandicum (*Nees*) (Laurus cinnamomum). The bark.	"	"
Coccus Cochineal.	Coccus cacti	- -	- -
Cocculus Indicus, *E.* Cocculus Indicus.	Anamirta cocculus The fruit.	Menispermaceæ	Monœcia
Colchici cormus Cormus of meadow saffron.	Colchicum autumnale The fresh and dried cormus of the wild plant.	Melanthaceæ	Hexandria
Colchici semen Seeds of meadow saffron.	The seeds	"	"
Colocynthis Colocynth, bitter apple.	Citrullus (cucumis) colocynthis, (*Schrad*) The decorticated fruit.	Cucurbitaceæ	Monœcia
Conium Hemlock.	Conium maculatum The fresh and dried leaves of the wild plant.	Umbelliferæ	Pentandria
Copaiba Copaiba.	Copaifera multijuga (*Hayne*) and other species. The oleo-resin, which flows from the cut trunk.	Leguminosæ Cæsalpineæ.	Decandria
Copaibæ oleum The oil of copaiba.	The oil distilled from the oleo-resin.	"	"
Coriandrum Coriander.	Coriandrum sativum The fruit.	Umbelliferæ	Pentandria
Cornu Hartshorn.	Cervus elaphus The horn.	- -	- -
Cornu ustum Burnt horn.	Phosphate of lime, prepared from horn by fire.	- -	- -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Monogynia -	Peru - -	Febrifuge, tonic	Quinia and cinchonia.	Dec., Ext.
- -	- -	Detergent.		
Monogynia -	Ceylon and Java	Stim., arom. -	- -	(Ess, *D.*) Sp. cin. (Sp. am. arom. *D.*).
„	„	Stim., arom., astring.	Vol. oil, and tannin.	Conf. arom. (Dec. hæm. *E.*, Elect. cat. *E.*), Pul. al. co. (Pul. arom. *D. E.*, Pul. catech. co. *D.*), Pul. cin. co., Pul. cinch. co., Pul. kin. co. (Sp. cin. *E.*), Sp. am. arom., Tr. card. co., Tr. catech. co., Tr. cin. et co., Tr. lavand. co., Vin. opii.
- -	Mexico and East Indies.	Colouring agent	- -	Syrup, Tinct. *D.*
Dodecandria -	East Indies -	Narcotic poison, chiefly used externally.	Picrotoxin (crystal. bitter).	(Unguent, *E.*)
Trigynia -	Indigenous - Hamburg.	Acrid cath., sedative, diuretic, nauseant.	Colchicina -	Acet., Ext. et Ext. acet Vinum.
„	„	„	„	Tinct. et Tr. co.
Syngenesia -	Spain, Syria, Cape of Good Hope.	Drastic cathartic.	Colocynthin -	Enema, Ext., Pil. col. co.
Digynia -	Indigenous -	Narcotic, affecting chiefly the motor nerves.	Conia (vol. liquid.)	Catapl., Ext., Pil. con. co., Tinct., Ung.
Monogynia -	Brazil - -	Stim., diaphoretic.	Vol. oil, and resin.	
„	„	„		
Digynia -	Cultivated in Essex.	Arom., stim. -	Vol. oil -	Con. sen. (Inf. gent. *E.*)
- -	- -	Nutritive -	Gelatine.	
- -	- -	- -	- -	Pulv. Antim. co.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Ammoniacum - - Ammoniacum.	Dorema ammoniacum, (Don). Gum-resin exuding from the stem and stalks, hardenod in the air.	Umbelliferæ -	Pentandria -
Ammoniæ Carbonas, *E. D.* Carbonate or sesquicarbonate of ammonia.	Ammoniæ sesquicarbonas -	- -	- -
Ammonia Hydrochloras. Hydrochlorate of ammonia (sal ammoniac).	Ammoniæ hydrochloras Crystalline.	- -	- -
Ammoniæ Liquor, sp. gr. ·96. Solution of ammonia.	- - -	- -	- -
Ammoniæ Liquor fortior. Strong solution of ammonia, sp. gr. ·882.	- - -	- -	- -
Ammoniæ Sesquicarbonas Carbonate or sesquicarbonate of ammonia.	Ammoniæ sesquicarbonas. Crystalline.	- -	- -
Ammoniæ spiritus, *E.* - - Spirit of ammonia.	- - -	- -	- -
Amy'gdala amara, *E.* Bitter Almonds.	Amygdalus communis (var. a. De Candolle). The kernels.	Amygdaleæ -	Icosandria -
Amy'gdala (Jordanica). (dulcis, *Ph.* 1836.) Jordan (sweet) almond.	Amyg. commun. (var. dulcis). The kernels.	„	„
Amy'gdalæ oleum - Oil of almonds.	Amyg. com. (var. bitter and sweet). The oil expressed from the kernels of either.	„	„
Amy'lum - - - Starch.	Triticum vulgare (Villars). The fæcula of the seeds.	Gramineæ -	Triandria -
Ané'thum - - - Dill.	Anethum graveolens - The fruit.	Umbelliferæ -	Pentandria -
Anethi oleum - - Oil of dill.	The oil distilled from the fruit.	„	„
Angelica, *E.* - - - Archangel.	Angelica Archangelica - The root	„	„
Anisum - - - Anise.	Pimpinella anisum - The fruit.	„	„
Anisi oleum - - Oil of anise.	The oil distilled from the fruit.	„	„
Anthemis - - - Chamomile.	Anthemis nobilis - - The flowers (single).	Compositæ - Corymbiferæ.	Syngenesia -
Anthemidis oleum, (Anglicum). Oil of chamomile, (Eng.).	The oil distilled from the flowers.	„	„

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Digynia -	Persia - -	Stim., expect., emmen.	Resin - -	Empl. am., Emp. am. et hydrarg., Mist., Pil. ipecac. et scil., Pil. scil. co.
- -	- -	Stimulant, diaph., emet.	- -	Lin. Sp. am. arom., Sp. am. fœtid.
- -	- -	Refrig., alterative.		
- -	- -	Stim., rubefac., antacid.	- -	Lin., Lin. hydr. et Lin. co.
- -	- -	Caustic, rubefac.	- -	Lin. am. co., Lin. camp. co., Sp. am. arom. *D.*, Sp. am. fœtid. *D.*, Tr. am. co.
- -	- -	Stim., diaph., emet.	- -	Liq. am. sesq. Lin. am. sesq.
- -	- -	Stimulant.		
Monogynia -	South of Europe -	Sedative - -	Amygdalin and emulsin.	
„	„	Demulcent -	Emulsin -	Conf. et Mist., et Mist. acaciæ. et Mist. camph. *E.*
„	„	Emol., purg.		
Digynia -	Cultivated -	Nutritive, demul.	- -	Decoct., Enema opii.
Digynia -	Indigenous -	Aromatic -	Vol. oil -	Aqua.
„	„	„		
„	„	Aromatic, tonic	Vol. oil.	
„	Egypt, Spain -	Carminative -	„	
„	„	„	- -	Sp. anisi (Ess. *D.*), Tr. camph. co.
Polygamia superflua.	Indigenous -	Emetic, stomachic.	Vol. oil, tannin.	(Ext. *E.*), Inf.
„	„	Stim., carm.		

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Euphorbium, *E.* Euphorbium.	Euphorbiæ, undetermined species. The gum-resin.	Euphorbiaceæ	Monœcia
Farina Flour.	Triticum vulgare (Villars). The flour of the seeds.	Gramineæ	Triandria
Ferri limatura, *E.* Iron filings.	- - -	- -	- -
Ferri oxidum rubrum, *E.* Red oxide of iron.	Ferri sesquioxidum	- -	- -
Ferri sulphas venalis Commercial sulphate of iron (copperas).	Ferri sulphas (impura) Crystals.	- -	- -
Ferri sulphuretum, *E.* Sulphuret of iron.			
Ferrum in fila tractum. Iron wire.			
Ficus Figs.	Ficus carica The prepared fruit.	Urticaceæ	Polygamia
Filix, *E.* Male Fern.	Nephrodium filix mas. The rhizome.	Filices	Cryptogamia
Fœniculum Fennel.	Fœniculum dulce The fruit.	Umbelliferæ	Pentandria
Fœniculi oleum Oil of fennel.	The oil distilled from the fruit.	,,	,,
Galbanum Galbanum.	Galbanum officinale *Don?* The gum-resin.	,,	,,
Galla Galls.	Quercus infectoria A swelling on the twigs, caused by the Cynips gallæ tinctoriæ.	Cupuliferæ	Monœcia
Gentiana Gentian.	Gentiana lutea The root.	Gentianaceæ	Pentandria
Glycerina, *D.* Glycerine.	A sweet principle, produced during saponification., sp. gr. 1260.	- -	- -
Glycyrrhiza Liquorice.	Glycyrrhiza glabra The fresh and dried root.	Leguminosæ Papilionaceæ.	Diadelphia
Gossypium, *E.* Cotton wool.	Gossypium herbaceum Hairs attached to the seeds.	Malvaceæ	Monadelphia
Granati radix Pomegranate root.	Punica granatum Bark of the root.	Granateæ	Icosandria
Granatum Pomegranate.	The rind of the fruit	,,	,,
Guiaci lignum Guiacum wood.	Guiacum officinale The wood.	Zygophyllaceæ	Decandria

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Monandria -	Atlas Mountains, Africa.	Violent irritant, errhine.	Resin.	
Digynia -	Europe, &c. -	Nutrient -	Starch, gluten.	
- -	- -	- -	- -	(Mist. ferri arom. *D.*)
- -	- -	- -	- -	Empl. ferri.
- -	- -	Tonic - -	- -	Pil. ferri co.
Diœcia or Triœcia.	South of Europe.	Laxative -	Sugar - -	Con. sen., Dec. hord. co.
Filices - -	Indigenous -	Anthelmintic -	Vol. oil.	
Digynia -	„	Arom., stim. -	Vol. oil -	(Aqua, *E.*), Conf. pip. (Sp. jun. co. *D. E.*), Syr. sen.
„	„	„	- -	Sp. junip. co. (Ess. fœn. *D.*).
„	Persia - -	Discutient, antispas., emmen.	Vol. oil -	Empl. galb. (Emp. assaf. *E.*), Pil. galb. co.
Polyandria -	Aleppo, Smyrna	Astringent -	Tannic and gallic acids -	Decoct., Tinct., Ung. gall. co.
Digynia -	Alps - -	Bitter tonic, not astring.	Vol. oil, bitter prin.	Ext., Infus., Mist., Tr. gent. co. (Vin. *E.*).
- -	- -	Soothing emollient.		
Decandria -	Eng. and South of Europe.	Demulcent -	Glycyrrhine, uncrystallisable sugar.	Con. sen., Dec. hord. co., Ext.
Polyandria -	America, &c.			
Monogynia -	Europe and Asia.	Anthelmintic -	Undiscovered -	Decoct. gran. rad.
„	„	Astringent -	Tannin -	Decoct. granat.
„	Jamaica -	Stim., diaphoret.	Resin - -	(Dec. guiac. co. *E.*), Dec. sarz. co., Tinct. gu. co.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Guiacum (G. resina, *Ph.* 1836.) Resin of G.	The resin, prepared from the wood by fire.	Zygophyllaceæ	Decandria
Hæmatoxylum Log wood.	Hæmatoxylon campechianum. The wood.	Leguminosæ Cæsalpineæ.	,,
Helleborus Hellebore.	Helleborus niger The rhizome and root.	Ranunculaceæ	Polyandria
Hemidesmus, *D.* Indian sarsaparilla.	Hemidesmus Indicus The root.	Asclepiadaceæ	Pentandria
Hirudo The leech.	Sanguisuga (Hirudo, *Cuv.*) medicinalis et officinalis (*Savigny*).	- -	- -
Hordeum (Pearl) barley.	Hordeum distichon The seeds freed from the husks.	Gramineæ	Triandria
Hydrargyrum Mercury, quicksilver.	Hydrargyrum *colatum* (Strained).	- -	- -
Hyoscyamus Henbane.	Hyoscyamus niger The fresh and dried stem leaves of the second year's plant.	Solanaceæ	Pentandria
Jalapa Jalap.	Exogonium purga (*Benth.*) The tuber.	Convolvulaceæ	,,
Inula Elecampane.	Inula helenium The root.	Compositæ Asteroideæ	Syngenesia
Iodinium Iodine.	Iodine Crystalline	- -	- -
Ipecacuanha Ipecacuanha.	Cephaelis ipecacuanha The root.	Cinchonaceæ	Pentandria
Juniperi cucumina, *E.* Juniper tops.	Juniperus communis The tops.	Coniferæ	Diœcia
Juniperus Juniper.	The fruit	,,	,,
Juniperi oleum (Anglicum). Oil of Juniper (English).	The oil distilled from the fruit.	,,	,,
Kino (Indicum) Indian Kino.	Pterocarpus marsupium The juice which oozes from the cut bark, hardened in the sun.	Leguminosæ Papilionaceæ.	Diadelphia
Kousso (not in any Pharm.) Kousso.	Brayera anthelmintica The flowers.	Rosaceæ	Diœcia
Krameria Rhatany.	Krameria triandra The root.	Polygaleæ	Tetrandria

an Order.	Whence obtained.	Properties.	Active Principle.	Preparation.
gynia -	Jamaica -	Stim., diaphoret.	- -	Mist., Pil. hyd. chl. co., Pul. al. co.
"	Honduras and W. Indies.	Astringent -	Hæmatin, tannin.	Decoct., Ext.
gynia -	Germany -	Drastic cath., emmen.	Acrid vol. oil -	Tinct.
ia - -	E. Indies -	Diuret., diaph. -	Smilasperic acid -	Syrup.
-	Germany.			
ynia -	Britain -	Nutrient, demulcent.	Starch, sugar -	Decoct. et Dec. h. co. (Mist. *E.*, Mucil. *D.*).
. -	Spain and California, and China.			
ogynia -	Indigenous -	Anodyne, narcotic.	Hyoscyamia -	Ext., Tinct.
"	Brazil - -	Hydragogue cathartic.	Resin (jalapin)	Ext., Pulv. jalap. co., Pulv. scam. co., Tinct. jal.
gamia superflua.	Indigenous -	Arom., tonic, diaph.	Helenin, inulin.	Conf. pip. nigr.
. -	- -	- -	- -	Tinct. iodin. co.
ogynia -	Brazil - -	Emetic, diaphoretic.	Emetina -	Pil. conii. co., Pil. spec. c. scil., Pul. ipec. co. (Syrup. *E.*), Vinum.
adelphia -	Indigenous -	Diuretic - -	Vol. oil - -	Dec. scoparii, *E.*
"	France and Germany.	"	"	Dec. scop. co. (Inf. *D.*, Mist. creosot. *E.*, Sp. jun. co. *D.E.*).
"	"	"	- -	Sp. jun. co.
andria -	East Indies, Africa.	Astringent -	Tannin -	(Elect. catechu, *E.*), Pul. kino co. (Pul. alum. co. *E.*, Pul. cat. co. *D.*), Tinct.
ndria -	Abyssinia - -	Anthelmintic -	Unknown.	
ogynia -	Peru -	Astringent -	Tannin -	(Ext. *E.*), Inf. (Tr. *D.*).

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Lacmus, *E.* Litmus.	Roccella tinctoria Peculiar colouring matter prepared from the lichen.	Lichenes	Cryptogamia
Lactuc Garden Lettuce.	Lactuca sativa The fresh plant.	Compositæ Cichoraceæ.	Syngenesia
Lactuca virosa, *D.* Acrid lettuce.	L. virosa The fresh plant.	”	”
Lactucarium, *E. D.* Lactucarium, or lettuce opium.	L. sativa et virosa The inspissated juice.	”	”
Lavandulæ oleum (Anglic.). English oil of lavender.	Lavandula vera (L. spica var. a Linn.). The oil distilled from the flowers.	Labiatæ	Didynamia
Laurus Bay berries.	Laurus nobilis The fruit.	Lauraceæ	Enneandria
Lauro-cerasus, *E. D.* Cherry-laurel.	Prunus lauro-cerasus The leaves.	Amygdaleæ	Icosandria
Limones, *E. D.* Lemons.	Citrus limonum et medicum (Risso). The fruit.	Aurantiaceæ	Polydelphia
Limonum cortex Lemon peel.	The fresh and dried external rind of the fruit.	”	”
Limonum oleum Oil of lemons.	The volatile oil expressed from the rind of the fruit.	”	”
Limonum succus Lemon juice.	The juice of the fruit	”	”
Lini farina, *E.* Linseed meal.	Linum usitatissimum Meal of the seeds deprived of the oil by expression.	Linaceæ	Pentandria
Lini oleum Linseed oil.	The oil expressed from the seeds.	”	”
Lini semen Linseed.	The seeds	”	”
Linum catharticum, *E.* Purging flax.	Linum catharticum The herb.	”	”
Lithargyrum, *E.* Litharge.	Plumbi protoxidum	- -	- -
Lobelia Indian tobacco.	Lobelia inflata The flowering plant.	Lobeliaceæ	Pentandria
Lupulus Hops.	Humulus lupulus The amentum or catkin.	Urticaceæ	Diœcia
Lupulina, *D.* Lupuline.	Yellow powder, separated from hop strobiles by rubbing and sifting	”	”
Lytta, *D.* (see Cantharis.)			
Magnesiæ sulphas Sulphate of magnesia (Epsom salts).	Magnesiæ sulphas Crystals.	- -	- -

Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
-	Canary Islands, Azores.	Test for acids.		
gamia qualis.	Europe -	Pure sedative -	Lactusin (bitter).	Ext.
„	„	„	„	
„	„	„	- -	Tinct (Troch. *E*.).
nospermia	Mitcham, Surrey, and France.	Stim., antispas.	Vol. oil -	(Sp. lav. co. *E*.), Tr. am. co., Tr. lav. co.
nogynia -	South of Europe.	Stim., narcot., emet.	Fixed and vol. oils.	Conf. rutæ, Empl. cumini.
„	Cultivated in England.	Sedative, narcot.	Hydrocyanic acid.	Aqua, *E*.
ndria -	South of Europe -	Refrig., antiscorbutic.	Citric acid.	
„	„	Grateful flavour	Vol. oil -	Tinct
„	„	Fragrant odour	- -	(Sp. am. arom. *D*. *E*.)
„	„	Refrigerant -	Citric acid -	Syrup.
tagynia -	Indigenous -	Emollient.		
„	„	„	- -	Lin. Calcis, *E*.
„	„	„	Fixed oil -	Catapl. (Dec. lini co. *D*.), Inf.
„	„	Cathartic -	Unknown.	
- -	- -	- -	- -	Plasters.
nogynia -	North. States of America.	Nauseant, emet., expect., antispas.	Vol. acrid oil? lobelina.	Tinct. et. Tr. lob. æth.
ntandria -	Indigenous -	Tonic hypnotic	Vol. oil, lupuline.	Ext., Inf., Tinct.
„	„	„		
- -	- -	Cathartic -	- -	Enema cath. *E*., Pul. salin. *E*.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Malva, *E.* Mallow.	Malva sylvestris The herb.	Malvaceæ	Monadelphia
Manganesii binoxidum Binoxide of manganese.	- - -	- -	- -
Manna Manna.	Fraxinus rotundifolia et F. ornus.? The juice which flows from the cut bark, hardened in the air.	Oleaceæ, sub. ord. fraxineæ	Diandria
Maranta Arrow-root.	Maranta arundinacea The fæcula of the tuber	Marantaceæ	Monandria
Marmor album, *E. D.* Marble.	Massive crystalline carbonate of lime.		
Mastiche Mastick.	Pistachia lentiscus (var. Chia.). The resin which flows from the cut bark.	Terebinthaceæ	Diœcia
Matico, *D.* Matico.	Artanthe elongata The leaves.	Piperaceæ	Diandria
Mel Honey.	Apis mellifica Juice of flowers, deposited in honeycomb and purified.	- -	- -
Melissa, *E.* Balm.	Melissa officinalis The herb.	Labiatæ	Didynamia
Mentha piperita Peppermint.	Mentha piperita The fresh and dried flowering plant.	„	„
Menthæ piperitæ oleum Oil of peppermint.	The oil distilled from the flowering plant.	„	„
Mentha viridis Spearmint.	Mentha viridis The fresh and dried flowering plant.	„	„
Menthæ viridis oleum Oil of Spearmint.	The oil distilled from the flowering plant.	„	„
Menyanthes, *E.* Buckbean.	Menyanthes trifoliata The leaves.	Gentianaceæ	Pentandria
Mezereum Mezereon.	Daphne mezereum The bark of the root.	Thymelaceæ	Octandria
Mori succus Mulberry juice.	Morus nigra The juice of the fruit.	Urticaceæ	Monœcia
Morphiæ acetas Acetate of morphia.	Salt prepared from opium. Crystals.	- -	- -
Morphiæ hydrochloras Hydrochlorate of morphia.	Ditto	- -	- -
Morrhuæ oleum Cod's liver oil.	Gadus morrhua The oil prepared from the liver.	- -	- -
Moschus Musk.	Moschus moschiferus Concrete found in the follicles of the prepuce.	- -	- -

Linnæan Order.	Whence obtained.	Properties.	ctive Principle.	Preparations.
Polyandria	Indigenous	Demulcent	Mucilage	Decoct. (not off.).
- -	- -	Not used medicinally.		
Monogynia	Sicily, Calabria	Laxative. When quite fresh, nutritive.	Mannite (sugar).	Conf. cas., Syr. sennæ.
,,	West Indies	Nutrient	Starch (fæcula).	
Pentandria	Levant	Fragrant (as a masticatory).	Vol. oil, resin	Tinct. am. co.
Monogynia	Peru	Astringent	Tannin	Inf., Tinct. *D.*
- -	- -	Demulcent, laxative.	- -	Mel boracis, M. rosæ Oxymel, Ox. scillæ.
Gymnospermia	Garden herb	Diaph., emmen.	Vol. oil.	
,,	Indigenous	Carminative	Vol. oil	Aqua.
,,	(America) ,,	,,	- -	Sp. men. pip. (Ess. *D.*)
,,	,,	,,	Vol. oil	Aqua (Inf. *D.*).
,,	,,	,,	- -	Sp. men. vir. (Ess. *D.*).
Monogynia	,,	Diuretic, tonic	Bitter extractive.	
,,	,,	Diaph., acrid	Acrid resin, daphnin.	Dec. sarz. co. (Dec. mez. *E.*).
Tetrandria	South of Europe.	Refrigerant laxative.	Tartaric acid	Syrup.
- -	- -	Narcotic	- -	Liq. morph. acet., Syrup. *D.* Liq. mor. hydroch., Sol. mor. mur. *E.*
- -	- -	,,	- -	Syrup. *D.*, Troch. et Troch. mor. et ipec. *E.*
- -	Newfoundland	Tonic.		
- -	Mountainous regions of Asia.	Antispasmodic.		

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Mucuna Cowhage.	Mucuna pruriens The hairs of the fruit.	Leguminosæ Papilionaceæ.	Diadelphia
Myristica Nutmeg.	Myristica officinalis (M. moschata, Plumb.) The seed deprived of its covering.	Myristaceæ	Diœcia
Myristicæ oleum (adeps, *E.*). (Concrete) oil of nutmeg.	Concrete oil, expressed from the seed.	"	"
Myristicæ oleum (vol.), *E.* Volatile oil of nutmeg.	Oil distilled from the fruit.	"	"
Myrrha Myrrh	Balsamodendron myrrha (Nees). Gum-resin exuded from the bark.	Terebinthaceæ	Octandria
Nux vomica Nux vomica.	Strychnos nux-vomica The seeds.	Apocynaceæ Loganiaceæ	Pentandria
Olivæ oleum Olive oil.	Olea Europæa The oil expressed from the fruit.	Oleaceæ	Diandria
Opium (Turcicum) Turkey opium.	Papaver somniferum The juice exuded from the unripe fruit when cut, hardened in the air.	Papaveraceæ	Polyandria
Origanum, *E.* Marjorum.	Origanum vulgare The herb.	Labiatæ	Didynamia
Ovi albumen White of egg.	Gallus Bankiva (var. domesticus). The albumen.	- -	- -
Ovi vitellus Yolk of egg.	The yolk	- -	- -
Panis Bread.	Panis (triticea) Wheaten bread.	- -	- -
Papaver Poppy (heads)	Papaver somniferum The ripe fruit (capsules), (not quite ripe, *Ed. Ph.*).	Papaveraceæ	Polyandria
Pareira Pareira (velvet leaf, *D.*).	Cissampelos Pareira The root.	Menispermiaceæ	Diœcia

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Decandria	West Indies	Anthelmintic.		
Monadelphia	Moluccas	Aromatic	Vol. oil	Conf. arom. (Elect. cat. *E.*, Pul. cret. co. *D. E.*, Pul. arom. *D.*, Pul. cat. co. *D.*), Sp. amm. co., Sp. myr., Tr. lav. co.
"	"	Rubefacient	- -	Emp. picis.
"	"	Aromatic	- -	(Sp. am. arom. *D.*, Ess. *D.*).
Monogynia	Arabia and E. I.	Expect., emmen.	Vol. oil, resin	Dec. al. co. (Decoct. *D.*), M. ferri co., Pil. al. c. myr., Pil. ferri co., P. galb. co., Pil. rhei co., Tr. al. co., Tr. myr.
"	East Indies, Ceylon.	Tonic, excitant of motor nerves.	Strychnia	Ext.
"	South of Europe.	Laxative	- -	(Enema cath. *E.*) and various ointments.
"	Turkey and Egypt.	Narcotic	Morphia	Conf. op. (Elect. cat. *E.*, Elect., op. *E.*), Emp. opii, Enema, Ext. op., Vin. op., Pil. sap. co., Pil. styr. co. (Pil. plumb. op. *E.*), Pul. ipec. co., Pul. kino co., Tr. cam. co., Tr. op. (Tr. op. am., Troch. *E.*), Vin., Ung.
Gymnospermia	Indigenous	Stim., antispasmodic.	Vol. oil.	
- -	- -	Used chiefly as a vehicle.		
- -	- -	Used chiefly as a vehicle.		
- -	- -	Used chiefly as a vehicle.		
Monogynia	Cultivated in England.	Narcotic	Morphia	Decoct., Ext. (Inf. *E.*), Syrup.
Monadelphia	West Indies	Tonic to mucous membranes.	Cissampelin	Decoct., Ext. Inf. *D. E.*

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Petroleum - - Barbadoes tar. Petroleum.	A black liquid bitumen springing spontaneously from the earth.	- -	- -
Phosphorus - - Phosphorus.	- - -	- -	- -
Pimenta - - - Pimenta (allspice).	Eugenia (myrtus) pimenta. The unripe fruit.	Myrtaceæ -	Icosandria -
Pimentæ oleum - - Oil of pimenta.	The oil distilled from the fruit.	,,	,,
Piper longum - - Long pepper.	Piper longum - - The unripe fruit.	Piperaceæ -	Diandria -
Piper nigrum - - Black pepper.	Piper nigrum - - The unripe fruit.	,,	,,
Pix (pix nigra, *Ph.* 1836). Pitch.	Dry bitumen prepared from liquid pitch.	- -	- -
Pix Burgundica - - Burgundy pitch.	Abies excelsa - - Impure resin, prepared from turpentine.	Coniferæ -	Monœcia -
Pix liquida - - Tar.	Pinus sylvestris, and other species. Liquid bitumen, prepared from the wood by fire.	,,	,,
Plumbi acetas - - Acetate (sugar) of lead.	Plumbi acetas - - Crystals.	- -	- -
Plumbi carbonas, *E. D.* - Carbonate of lead.	- - -	- -	- -
Plumbi nitras, *E.* - - Nitrate of lead.	- - -	- -	- -
Plumbi oxydum - - Oxide of lead, or litharge.	Plumbi oxydum - - (Semivitrified).	- -	- -
Plumbi oxydum rubrum, *E.* - Red lead.	A compound of protoxide and binoxide of lead. -	- -	- -
Potassæ aqua effervescens, *E.* Kali water.	- - -	- -	- -
Potassæ bicarbonas - Bicarbonate of potash.	Potassæ bicarbonas - Crystals.	- -	- -
Potassæ bichromas, *D.* - Bichromate of potash.	- - -	- -	- -
Potassæ bisulphas, *E.* Bisulphate of potash.	- - -	- -	- -
Potassæ bitartras - - Bitartrate of potash. Cream of tartar.	Potassæ bitartras - Crystalline.	- -	- -
Potassæ carbonas - - Carbonate of potash (pearl ashes).	- - -	- -	- -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	Barbadoes.			
- -	- -	- -	- -	Acid. phosp. dil.
Monogynia -	West Indies -	Aromatic -	Vol. oil -	Aqua (Spr. *E.*), Syr. rhamni.
„	„	„	- -	Sp. (Ess. *D.*)
Trigynia -	East Indies -	Acrid and stimulant.	Vol. oil, piperin.	Conf. opii, Pul. cin. co., Pul. cret. co.
„	„	Acrid and stimulant.	Vol. oil, piperin.	Conf. pip., Conf. rutæ (Emp. canth. co. *E.*)
- -	Sweden and America.	Detergent	- -	Ung. picis.
Monadelphia -	Northern countries of Europe.	Rubefacient -	- -	Emp.cumin., Emp.picis.
„	Northern countries of Europe.	Detergent -	- -	Ung. picis liquid.
- -	- -	Astringent -	- -	Cerat. (Pil. plumb. op. *E.*).
- -	- -	Cooling astring. -	- -	Ung. plumb. carb.
- -	- -	Not used in med.		
- -	- -	Cooling astring.	- -	Cer. sapon. co., various plasters.
- -	- -	Not used medicinally.		
- -	- -	Antacid.		
- -	- -	„	- -	(Pul. efferv. *D. E.*).
- -	- -	Seldom used internally.		
- -	- -	Acid purgative.		
- -	Trieste and Marseilles.	Diuretic - Refrig aper.	- -	(Conf. sulph. *D.*, Dec. scop. *E.*), Pul. jalap. co. (Pul. scam. co. *E.*).
- -	America -	Antacid.	- -	Dec. al. co.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Potassæ chloras - - Chlorate of potash.	Potassæ chloras - - Crystals.	- -	- -
Potassæ nitras - - Nitrate of potash (salt-petre).	Potassæ nitras - - Crystals.	- -	- -
Potassæ sulphas - - Sulphate of potash.	Potassæ sulphas - - Crystals.	- -	- -
Potassæ sulphas sulphure, *E.* Nature undetermined.	- - -	- -	- -
Potassæ tartras - - Tartrate of potash.	Potassæ tartras - -	- -	- -
Potassii ferrocyanidum. Ferrocyanide of potassium, or prussiate of potash.	Potassii ferrocyanidum - Crystals.	- -	- -
Potassii iodidum - - Iodide of potassium.	Potassii iodidum - - Crystals.	- -	- -
Potassii sulphuretum - Sulphuret of potassium.	- - -	- -	- -
Prunum - - - Prunes.	Prunus domestica - The prepared fruit.	Rosaceæ - Amygdaleæ.	Icosandria -
Prunus lauro-cerasus, *D.* Cherry laurel.	- - -	- -	- -
Pterocarpus - - Red sandal wood.	Pterocarpus santalinus - The wood.	Leguminosæ - Papilionaceæ	Diadelphia -
Pulegium (mentha pulegium, *Ph.* 1836). Pennyroyal.	Mentha pulegium - The fresh and dried flowering plant.	Labiatæ - -	Didynamia -
Pulegii oleum (Menthæ pulegii oleum, *Ph.*1836). Oil of pennyroyal.	The oil distilled from the flowering plant.	”	”
Pyrethrum - - Pellitory of Spain.	Anacyclus (anthemis), pyrethrum. The root.	Compositæ - Corymbiferæ.	Syngenesia -
Pyrola, *E. D.*	See Chimaphila - -	- -	- -
Quassia - - - Quassia.	Picræna (quassia) excelsa (*Lindl.*). The wood.	Simarubiaceæ -	Decandria -
Quercus - - - Oak bark.	Quercus pedunculata (Willd.). The bark.	Cupuliferæ -	Monœcia -
Quinæ disulphas (sulphas, *E.*). Disulphate of quinine.	A salt prepared from *yellow* cinchona bark. Crystals.	- -	- -
Resina - - - Resin.	The residue of turpentine, after the oil has been distilled.	- -	- -
Rhamni baccæ, *E.* Buckthorn berries.	Rhamnus catharticus - The fruit.	Rhamnaceæ -	Pentandria - -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	- -	Stim. seldom used intern.		
- -	East Indies -	Sedative diuret.	- -	Ung. sulph. co.
- -	- -	Laxative -	- -	Pul. ipec. co. (Pul. salin. *E*.).
- -	- -	Acts upon the skin.		
- -	- -	Not used internally.		
- -	- -	Inert., not used internally.		
- -	- -	Alterative, &c.	- -	Emp. pot. iodid., Tinct. iod. co., Ung. iod. co., Ung. pot. iod., Liq. pot. iod co. *D*.
- -	- -	Irritant, seldom used internally.		
Monogynia -	France -	Laxative -	Sugar - -	Con. sen.
- -	- -	- -	- -	Aqua, *E*.
Decandria -	Ceylon -	Fine red colour	Colouring prin	(Sp. lav. co. *E*.), Tr. lav. co.
Gymnospermia	Indigenous -	Emmenagogue	Vol. oil -	Aqua.
„	„	„	- -	Spt. (Ess. men. p. *D*.)
Polygamia superflua.	Levant -	Sialogogue -	Pyrethrin. (acrid resin)	
- -	- -	- -	- -	Decoct.
Monogynia -	Jamaica -	Bitter tonic, not astringent.	Bitter prin., vol. oil, no tannin.	(Ext. *E*.), Inf. (Tinct. et. Tr. co. *E*.).
Polyandria -	Indigenous -	Astringent -	Tannin -	Decoct.
- -	- -	Febrifuge, tonic.		
- -	Sweden and America.	Rubefacient	- -	Cerat. Empl.
Monogynia	Indigenous. -	Cathartic -	Purg. prin. not fully known.	

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Rhamni succus Buckthorn juice.	The juice of the fruit	Rhamnaceæ	Pentandria
Rheum (sinense) Rhubarb.	Uncertain species of rheum. The root.	Polygonaceæ	Enneandria
Rhœas Red poppy.	Papaver rhœas The fresh petals.	Papaveraceæ	Polyandria
Ricini oleum Castor oil.	Ricinus communis The oil prepared from the seed by heat or pressure.	Euphorbiaceæ	Monœcia
Rosa canina Dog rose.	Rosa canina The fresh fruit (hips).	Rosaceæ	Icosandria
Rosa centifolia (Damask, *E.*) cabbage rose.	R. centifolia The fresh petals.	"	"
Rosa Gallica Red rose.	R. Gallica The fresh and dried unblown petals.	"	"
Rosæ oleum, *E. D.* Attar of roses.	R. centifolia Volatile oil from the petals.	"	"
Rosmarinus, *E. D.* Rosemary.	Rosmarinus officinalis The tops.	Labiatæ	Diandria
Rosmarini oleum (Anglic.). English oil of rosemary.	The oil distilled from the flowering tops.	"	"
Ruta Rue.	Ruta graveolens The leaves.	Rutaceæ	Decandria
Rutæ oleum Oil of rue.	The oil distilled from the flowering plant.	"	"
Sabadilla, *E.* Sevadilla.	Veratrum sabadilla. Helonias officinalis, and probably other Melanthaceæ. The fruit.	Melanthaceæ	Hexandria
Sabina Savine.	Juniperus sabina The fresh and dried tops.	Coniferæ	Diœcia
Sabinæ oleum Oil of savine.	The oil distilled from the tops.	"	"
Saccharum Sugar (white).	Saccharum officinarum The juice of the stem, prepared, purified, and crystallised.	Gramineæ	Triandria
Sacchari fæx Treacle or molasses.	The impure prepared juice.	"	"
Saccharum lactis, *D.* Sugar of milk.			
Sagapenum Sagapenum.	Unknown plant Gum-resin.	Umbelliferæ ?	- -
Sago Sago.	Sagus lævis (*Rumph*) and probably other species of palms. The fecula of the stem.	Palmæ	Monœcia

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Monogynia	Indigenous	Cathartic	Purg. prin., not fully known.	Syrup.
„	Confines of China, East Indies, Russia.	Purgative, astringent.	Rhabarberic acid (purg. prin), tannin.	Ext., Inf., Pil. rhei. co. (Pul. rhei. co. *D. E.*), Tr. rhei. co. (Vin. *E.*).
„	Indigenous	Red colour	- -	Syrup.
Monadelphia	East and West Indies.	Purgative	- -	Pil. cal. co. *D.*
Polygynia	Indigenous	Refrig., astring.	Citric and malic acids.	Conf.
„	Asia, cultivated in Surrey.	Odoriferous, laxative.	Vol. oil and lax. prin.	Aqua, Syrup.
„	South of Europe and Surrey.	Tonic, astring.	Tannic acid	Conf. Inf., Mel. (Syrup. *D. E.*).
„				
Monogynia	Garden herb	Stim. carmin.	Vol. oil	Sp. *E.*
„	- -	„	- -	Sp. (Ess. *D.*, Sp. am. arom. *E.*, Sp. lav. co. *E.*).
„	Garden herb	Stim., narc., antispas.	Vol. oil, bitter ext.	Conf.
„	„	„		
Trigynia	Mexico, Vera Cruz	Acrid narcotic	Veratria.	
Monadelphia	Cultivated in England.	Irritant emmen.	Vol. oil	Ung.
„				
Digynia	East and West Indies.	Nutritive	- -	Syrups.
„	„	Laxative.		
- -	Levant	Antispasmodic	Vol. oil	Conf. rutæ, Pil. galb. co.
Hexandria	East Indies	Nutrient.		

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Salicis cortex, *E.* Willow bark.	Salix caprea The bark.	Salicaceæ	Diœcia
Sambucus Elder.	Sambucus nigra The fresh flowers.	Caprifoliaceæ	Pentandria
Sapo (durus *E.*) Soap (Castile, or Spanish	Soap made from olive oil and soda.	- -	- -
Sapo mollis Soft (sweet) soap.	Soap made from olive oil and potash.	- -	- -
Sarza (Jamaicensis) Jamaica sarsaparilla.	Smilax officinalis (Kunth ?) The root.	Smilaceæ	Diœcia
Sassafras Sassafras.	Sassafras officinale (Nees), (laurus sassafras). The root.	Lauraceæ	Enneandria
Scammonium Scammony.	Convolvulus scammonia. The gum-resin emitted from the sliced root.	Convolvulaceæ	Pentandria
Scilla Squill.	Urginea scilla (Stein), (scilla maritima). The fresh bulb.	Liliaceæ	Hexandria
Scoparius Broom.	Cytisus scoparius The fresh and dried tops.	Leguminosæ Papilionaceæ.	Diadelphia
Senega Senega.	Polygala senega The root.	Polygaleæ	”
Senna Alexandrina Alexandrian senna.	Cassia officinalis ? (senna off. Roxb.), et C. obovata. The leaves.	Leguminoseæ Cæsalpineæ.	Decandria
Senna Indica Indian senna.	Cassia officinalis (senna off., Roxb.). The leaves.	”	”
Serpentaria Serpentary.	Aristolochia serpentaria. The root.	Aristolochiaceæ	Gynandria
Sevum Suet (mutton).	Ovis aries The prepared fat.	- -	- -
Silex contritus Powdered flint.	- - -	- -	- -
Simaruba, *E. D.* Simaruba, Mountain damson.	Simaruba amara The bark of the root.	Simarubiaceæ	Decandria
Sinapis Mustard.	Sinapis nigra, et S. alba The seeds.	Cruciferæ	Tetradynamia
Sodæ aqua effervescens, *E.* Soda water.	- - -	- -	- -
Sodæ biboras, *D.* Borax.	- - -	- -	- -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Diandria -	Indigenous -	Febrifuge -	Salicin.	
Trigynia -	Indigenous -	Sudorific, diuret., aperient.	Vol. oil -	Aqua, Ung.
- -	France and Spain.	Detergent, ant. acid, laxative.	- -	Various pills.
- -	- -	„ & Irritant -	- -	Enema Colocynth, Ung. Sulph. co.
Hexandria -	West Indies, Brazil.	Alterative -	Unknown? - Smilacin.	Decoct. et Dec. sar. co., Ext. sar., Liq., Syrup.
Monogynia -	S. States of America, Honduras.	Stim., sudorific	Vol. oil -	Decoct. sars. co. (Dec. guiac. co. *E.*).
„	Aleppo -	Cathartic -	Resin - -	Conf. (Mist. *E.*), Pil. coloc. co., Pul. scam. co.
- -	Shores of the Mediterranean	Expect., diuretic.	Scillitin -	Oxymel., Pil. ipec. co., Pil. scil. co. (Syrup, *D. E.*), Tinct.
Decandria -	Indigenous -	Diuretic -	Concrete vol. oil, salts of potash & lime.	Decoct. sc. co.
Octandria -	United States of America.	Stim. and expect., diaph.	Polygalic acid	(Elect. op. *E.*), Decoct. (Inf. *E.*).
Monogynia -	Alexandria -	Purgative -	Cathartin -	Conf. sennæ, Inf., Mist. gent. co., Syrup, Tr. sen. co.
„	East Indies -	„	„	
Hexandria -	Virginia and Pennsylvania.	Stim., tonic, and diaph.	Vol. oil, bitter prin.	Inf. Tinct.
- -	- -	Emollient -	- -	Various ointments.
- -	- -	Only used in pharmacy.	- -	Extemporaneous preparation of distilled waters.
Monogynia -	Guiana and Jamaica.	Tonic, sometimes emetic.	Quassite, bitter resin, vol. oil.	Inf.
Siliquosa -	Indigenous -	Acrid stim., emetic, rubefacient.	Peculiar prin. forming vol. oil & fixed oil.	Catapl. (Emp. canth. co. *E.*), Inf. arm. co.
- -	- -	Antacid.		
- -	- -	Detergent.	- -	Mel boracis.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Sodæ bicarbonas (S. sesquicarbonas. *Ph.* 1836) Bicarbonate of soda.	- - -	- -	- -
Sodæ carbonas - - Carbonate of soda.	Sodæ carbonas - - Crystals.	- -	- -
Sodæ phosphas - - Phosphate of soda.	Sodæ phosphas - - Crystals.	- -	- -
Sodæ potassio-tartras - Potassio-tartrate of soda.	Sodæ potassio-tartras - Crystals.	- -	- -
Sodæ sulphas - - Sulphate of soda. Glauber salts.	Sodæ sulphas - - Crystals.	- -	- -
Sodii chloridum - - Chloride of sodium (common salt).	Sodii chloridum - Crystals.	- -	- -
Spigelia, *E.* - - - Indian pink.	Spigelia marilandica - The root.	Spigeliaceæ -	Pentandria -
Spiritus pyroxilicus, *D.* sp. gr. 816. Pyroxilic spirit.	- - -	- -	- -
Spiritus rectificatus - Rectified spirit (spirit of wine).	Alcohol (diluted) - Sp. gr. ·838.	- -	- -
Spiritus tenuior - - Proof spirit.	Alcohol (more diluted) Sp. gr. ·920. (·912, *E.*)	- -	- -
Spiritus vini Gallici - Brandy (French).	Spirit distilled from French wine.	- -	- -
Spongia, *E.* - - Spongia.	Spongia officinalis - -	- -	- -
Stannum, *E. D.* - - Tin.	- - -	- -	- -
Staphisagria - - Stavesacre.	Delphinium staphisagria. The seeds.	Ranunculaceæ -	Polyandria -
Stramonii folium - - Stramonium or thorn-apple.	Datura stramonium - The leaves.	Solanaceæ -	Pentandria -
Stramonii semen - - Stramonium seeds.	The seeds - -	,,	,,
Strychnia - - - Strychnine.	An alkali prepared from nux vomica. Crystals.	Apocynaceæ - Loganiaceæ	,,
Styrax - - - Storax.	Plant doubtful - - Liquid balsam.	Styraceæ ? -	Decandria ? -
Succinum, *D.* - - Amber.	- - -	- -	- -
Succini oleum, *D.* - - Oil of amber.	Oil obtained by its destructive distillation.	- -	- -
Sulphur - - - Sulphur (flowers of)	Sulphur (Sublimatum) -	- -	- -

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
- -	- -	Antacid -	- -	(Pul. efferv. *E.*).
- -	- -	Antacid.		
- -	- -	Laxative.		
- -	- -	"		
- -	- -	Cathartic.		
- -	- -	Laxative dietetic.	- -	(Pul. salin. *E.*)
Monogynia -	S. States of America.	Anthelmintic -	Bitter ext.	
- -	- -	Stim., expectorant.		
- -	- -	Stimulant.		
- -	- -	"		
- -	- -	"		
- -	Mediterranean.			
- -	- -	Anthelmintic.		
Trigynia -	Germany and S. of Europe.	Acrid narcotic	Delphinia.	
Monogynia -	Indigenous -	Narcotic -	Daturia, empyreumatic oil.	Ext.
"	"	"	- -	(Tinct. *D.*)
"	East Indies, - Ceylon.	Excitant of the motor nerves.	- -	Strychniæ murias, *D.*
Monogynia ? -	Levant, Syria	Stim., expect.	Cinnamic acid -	(Ext. *E.*), Pil. styr. co., Tr. benz. co.
- -	South coasts of Baltic.	Stimulant.		
- -	- -	"		
- -	- -	Laxative, diaphoret.	- -	(Conf. sulph. *D.*), Sulph. iodid., Ung. et Ung. co.

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Sulphur præcipitatum Precipitated sulphur, or milk of sulphur.	Sulphur precipitated from sulphuret of calcium by hydrochloric acid.	- -	- -
Sumbul (not off.)	- - -	Umbelliferæ?	- -
Tabacum Tobacco.	Nicotiana tabacum The leaves.	Solanaceæ	Pentandria
Tamarindus Tamarind.	Tamarindus Indica The pulp of the fruit.	Leguminosæ Cæsalpineæ.	Monadelphia
Tapioca, *E. D.* Tapioca.	Janipha manihot The fæcula of the root.	Euphorbiaceæ	Monœcia
Taraxacum Dandelion.	Taraxacum Dens-leonis. (Leontodon taraxacum). The fresh root.	Compositæ Cichoreæ.	Syngenesia
Terebinthina (Americana) (Tereb. vulgaris, *Ph.* 1836). (Common turpentine.)	Pinus palustris et P. tæda. An oleo-resin which flows from the trunk when the bark is removed.	Coniferæ	Monœcia
Terebinthina Chia Chio turpentine.	Pistachia terebinthus An oleo-resin which flows from the cut trunk.	”	”
Terebinthina Veneta, *E.* Venice turpentine.	Abies larix Liquid resinous exudation.	”	”
Terebinthinæ oleum Oil or spirits of turpentine.	Oil distilled from turpentine and rectified.	- -	- -
Theriaca, *D.* Treacle.			
Thus Frankincense.	Abies excelsa et pinus palustris. Turpentine which exudes from the bark, hardened in the air.	”	”
Tiglii oleum Croton oil.	Croton tiglium The oil expressed from the seeds.	Euphorbiaceæ	Monœcia
Tormentilla Tormentilla.	Potentilla tormentilla The rhizome.	Rosaceæ	Icosandria
Tragacantha Tragacanth.	Astragalus verus A juice which exudes from the bark hardened in the air.	Leguminosæ Papilionaceæ.	Diadelphia
Valeriana Valerian.	Valeriana officinalis The root of the wild plant.	Valerianaceæ	Triandria
Veratria Veratria.	Asagræa officinalis (Lindl.) An alkali prepared from the seeds.	Melanthaceæ	Polygamia

Linnæan Order.	Whence obtained.	Properties.	Active Principles.	Preparations.
- -	- -	Laxative.		
- -	Asia? - -	Antispas. stim. -	Vol. oil. -	Inf. Tinct. (neither off.)
Monogynia -	America -	Narcotic, emetic, sedative.	Vol. oil, nicotina.	Enema (Vin. *E.*).
Triandria -	West Indies -	Refrig. laxative.	Tartaric, citric, malic acids; sugar.	Conf. cas., Con. sen.
Monadelphia -	Brazil - -	Nutrient -	Amylum.	
Polygamia æqualia. -	Indigenous -	Laxative, diuretic.	Salts of potash, bitter matter.	Decoct. tarax., Dec. scop. co., Ext.
Monadelphia -	N. America -	Stim. diuretic	Vol. oil, resin.	
„	Syria, Greece.	„	„	
„	Italy - -	„	„	(Empl. canth. co. *E.*)
- -	- -	Stim. rubefac.	- -	Conf. *D.* Enema.
„	Canada -	Rubefacient, - discutient.	„	Emp. galb., Emp. opii, Emp. picis, Emp. pot. iod.
Monadelphia -	East Indies, - Ceylon.	Diuretic, cath.	- -	Lin. crotonis, *D.*
Polygynia -	Indigenous -	Astringent -	Tannin -	Decoct., Pul. cret. co.
Decandria -	Smyrna, Levant.	Demulcent -	Tragacanthin - (bassorin).	Conf. opii (Mucil. E.), Pul. trag. co.
Monogynia -	Indigenous -	Antispas. emmen.	Valerianic acid	Inf., Tinct. et co.
Monœcia -	Alps, Pyrenees	Acrid narcotic.		

Name for Prescriptions.	Scientific Name or Description.	Nat. Order.	Linnæan Class.
Veratrum White hellebore.	Veratrum album The rhizome.	Melanthaceæ	Polygamia
Vinum Xericum V. album Hispanicum, *D.* Sherry wine.	- - -	- -	- -
Viola Violet.	Viola odorata The fresh petals.	Violaceæ	Pentandria
Ulmus Elm bark.	Ulmus campestris Inner bark.	Ulmaceæ	"
Uva Uvæ passæ, *D. E.* Raisins.	Vitis vinifera Prepared fruit.	Vitaceæ	"
Uva ursi Bearberry.	Arctostaphylos Uva ursi The leaves.	Ericaceæ	Octandria
Zinci sulphas Sulphate of zinc.	Zinci sulphas Crystals.	- -	- -
Zincum. Zinc.			
Zingiber Ginger.	Zingiber officinale (*Roscoe*). The rhizome.	Zingiberaceæ	Monandria

Linnæan Order.	Whence obtained.	Properties.	Active Principle.	Preparations.
Monœcia -	Alps, Pyrenees	Acrid narcotic	Veratrin -	Vinum, Ung. sulph. co.
- -	- -	- -	- -	Medicated wines.
Monogynia -	Indigenous -	Laxative -	Violine -	Syrup.
Digynia -	„	Demulcent, tonic.	Tannic acid, mucilage. -	Decoct.
Monogynia -	South of Europe.	Refrig., laxative.	Sugar - -	Dec. hord. co.
„	Indigenous -	Astring. to urinary organs.	Tannic and gallic acids.	Decoct., Ext.
- -	- -	Emetic.		
Monogynia -	East and West Indies.	Stim., rubefacient.	Vol. oil, soft resin.	Conf. opii., C. scam., Inf. sennæ co., Pil. scil. co., Pul. cin. co., Pul. jal. co., Pul. scam. co. (Pul. arom. *E.*, Pul. rhei co. *E. D.*), Syr. rhamni, Syrup, Tr. rhei co., Tinct. zing.

PART II.

PREPARATIONS AND COMPOUNDS.

See Remarks on "Materia Medica," p. 14.

TESTS.

THE following tests are employed in ascertaining the nature or purity of chemical bodies.

ACIDUM HYDROSULPHURICUM (Hydrosulphuric Acid, Sulphhydric Acid or Sulphuretted Hydrogen, HS) is obtained by *heating* sulphuret of antimony with hydrochloric acid, or by acting upon sulphuret of iron with diluted sulphuric acid, without the aid of heat. It is used as a test for the presence of metallic substances.

With a solution of

Arsenic (acid or neutral)	it produces a	*yellow* precipitate.
Antimony (alk. or neut.)	"	*orange*
Bismuth, copper, lead,	"	brown or black
Mercury, silver, tin,	"	"
Iron	"	no effect
Zinc (alk. or neut.)	"	white
Alkaline and earthy metals	"	no effect.

AMMONIÆ HYDROSULPHURETUM or **AMMONII SULPHURETUM** (Hydrosulphuret of Ammonia, or Sulphuret of Ammonium, or Sulphide of Ammonium: Am HS, or NH^3,HS; or NH^4,S) is obtained by passing sulphuretted hydrogen into a solution of ammonia. It has, at first, a pale-yellow or brownish colour, which becomes darker on keeping. It soon spoils. It is used for the same purposes as sulphuretted hydrogen; but in testing for arsenic, the solution under examination must be rendered slightly acid, for no precipitate will form in an alkaline liquid, even if arsenic is present. Hydrosulphuret of Ammonia differs from Sulphuretted hydrogen in its effect upon the salts of iron, with which it forms a black precipitate, though the gas produces no effect.

AMMONIÆ OXALAS (Oxalate of Ammonia); obtained by neutralising carbonate of ammonia by oxalic acid, and evaporating the solution. It forms colourless silky needle-shaped crystals, which are easily soluble in water. Used chiefly as a test for *lime*, in a *neutral* solution of which it produces a *white* precipitate, soluble in nitric or hydrochloric acid.

Argenti Ammoniati Solutio, *E.* (Solution of Ammoniated Silver, or Ammonio-nitrate of Silver) is prepared by adding liq. ammoniæ to a solution of nitrate of silver in distilled water (gr. 44 in one fluid ounce) until the precipitate at first formed is nearly, but not quite, re-dissolved. It is used as a test for arsenious acid, with which it forms a yellow precipitate, soluble in nitric acid.

Argenti Nitras (Nitrate of Silver). A solution of one drachm of *freshly prepared* nitrate in an ounce of distilled water, *L.* (gr. 40 in 1600, *E.*) is used as a test for chlorine and all soluble chlorides, with which it forms a *white curdy* precipitate, soluble in solution of ammonia, but insoluble in nitric or any other acid. It is also used as a test for hydrocyanic acid.

Argentum (Silver Leaf) is used as a test for nitric acid in vinegar.

Aurum (Gold Leaf) is used as a test for hydrochloric acid in nitric acid.

Barii Chloridum (**Nitras**, *E.*), Nitrate or Chloride of Barium, is obtained by dissolving carbonate of barytes in nitric or hydrochloric acid, and evaporating the solution till slender colourless crystals are left. A solution of a drachm in an ounce (*L.*) of distilled water (gr. 40 in 800, *E.*) is used as a test for sulphuric acid or sulphates, with which it produces a white precipitate, insoluble in any known menstruum.

Cuprum (Copper) is used as a test of the presence of nitric acid or a nitrate.

Cupri Ammonio-sulphas (Ammonio-sulphate of Copper). A solution made by dropping liq. ammoniæ into a solution of sulphate of copper in distilled water, until the precipitate first formed is just re-dissolved, is used a test for arsenious acid; in a colourless neutral solution of which it produces a *green* precipitate, soluble in nitric acid.

Curcuma (Turmeric) is obtained from the rhizome of the Curcuma Longa, which is a species of ginger. It is generally seen in pieces one or two inches long, somewhat cylindrical, and without root fibres. Its taste is aromatic, and its colour yellow, which it readily imparts to spirit or water.

Composition.—It contains volatile oil, curcumin (resin) or the yellow colouring matter, and gum.

Properties.—Aromatic, and used on this account, as well as for its colour, in curry powder. It is only introduced into the pharmacopœia as a test for alkalies, which bodies change the yellow colour to a reddish-brown. This is not, however, quite distinctive of alkalies, for the vapour of hydrochloric acid, or a drop of strong sulphuric acid, produces a similar effect. When boracic acid is added to tincture of turmeric, and evaporated to dryness, it also converts the yellow colour into a brown.

Turmeric paper is prepared by dipping unsized or bibulous paper into a decoction or tincture of turmeric. When dry, it has a bright yellow colour, which is changed to brown by alkalies.

ICHTHYOCOLLA (Isinglass) is the dried and prepared swimming bladder of the sturgeon and several other kinds of fish. It is prepared in many ways, being sometimes cut into thin narrow curled fibres, at other times into flat or curled ribands, and at others not being cut at all, but resembling a dried bladder in appearance. It consists of *gelatine*, which is characterised by being soluble in boiling water and forming a solid jelly on cooling. It forms a precipitate (leather) with tannic acid, but not with gallic acid, and it is introduced into the Tests by the London College in order to distinguish these two acids. Under the name of blanc-mange, &c., it forms favourite articles of diet. A solution of it laid upon silk, forms " court plaster."

LACMUS (Litmus) is obtained from the lichen Roccella Tinctoria, which grows principally in the Azores. The exact method of preparing it is kept secret; but the general principle depends upon the combination of an ammoniacal compound (sometimes stale urine) with the colouring matter of the lichen. Litmus is sold in small cubical cakes, of a dirty blue colour.

Composition.—Very complicated. According to Kane, it consists of three, or sometimes four, principles, of which the most important are termed *erythrolitmite*, and *azolitmite*. These are combined with lime, potash, and ammonia.

Properties.—The blue colouring matter of litmus is soluble in both water and alcohol. Acids change the colour to red, (which is the natural colour of litmus,) by combining with the ammonia by which it had been previously converted to blue. The blue colour is restored by alkalies.

Litmus paper.—Litmus is only introduced into the pharmacopœia as a test for acids. The paper is made by dipping unsized or bibulous paper into an infusion of litmus, made with an ounce and a half of litmus to a pint of water. When dry, it has a blue colour, which is changed to red by acids.

LIQUOR CHLORINII (*recens preparatum*). Freshly prepared Solution of Chlorine. This is simply a solution of chlorine prepared by transmitting the gas into *cold* water, which dissolves most of it as it passes. It is used as a test for the presence of the salts of morphia.

LIQUOR INDIGO SULPHATIS (Solution of Sulphate of Indigo) is prepared by boiling powdered indigo in strong sulphuric acid. It forms a deep blue solution, which, when diluted with water, is used as a test for the presence of free chlorine in solution, the blue colour being removed by it.

PLATINI BICHLORIDUM (Bichloride of Platinum) is prepared by dissolving platinum in mixed nitric and hydrochloric acids (AQUA REGIA) with the aid of heat. It is a light brown or reddish solution, and is used as a test for potash and ammonia, either of which produces a precipitate with it.

Potassii et Hydrargyri Iodo-cyanidum (Iodo-cyanide of Potassium and Mercury) is prepared by adding a concentrated solution of bicyanide of mercury to a solution of iodide of potassium, when beautiful white pearly crystals are deposited. When these are dissolved in water, and added to a solution of any acid *except hydrocyanic*, they are decomposed and the red biniodide of mercury is set free. This test is used in the pharmacopœia to prove the absence of any other acid in the dilute hydrocyanic acid, which, if pure, produces no change upon the test.

Sodæ Phosphatis Solutio, *E.* Phosphate of Soda (free of efflorescence), 175 grains; distilled water, 8 fluid ounces. This solution is used as a test for the purity of litharge and sulphate of magnesia, which, if pure, give precipitates of a certain weight mentioned under these respective heads.

Stanni Protochloridum (Protochloride of Tin) is a colourless solution obtained by digesting pure grain tin with heat, in hydrochloric acid; and is used as a test of the presence of bichloride of mercury, with which it causes first a white, and then a black, precipitate.

ACIDS.

ACETUM (BRITANNICUM), *L. E.*

British Vinegar.

Remarks.— Vinegar is usually prepared in this country by fermenting an infusion of malt, and is called *malt vinegar*, to distinguish it from that obtained, in foreign countries, by the renewed fermentation of wine. Malt vinegar is a mixture of *acetic acid*, to which its sourness is owing; a little *alcohol* or *spirit;* a peculiar organic principle called *mucilage; colouring matter*, and *water*. The maker is allowed to add $\frac{1}{1000}$ of its weight of sulphuric acid.

This addition is allowed because of the natural presence of sulphates in the water from which the vinegar is made. It is quite possible that an ounce of spring water may contain as much sulphate of lime as would cause a precipitate of 1·14 gr. of sulphate of barytes on the addition of chloride of barium. If the law required the entire absence of sulphuric acid, the maker must use distilled water, which would add materially to the expense of the vinegar.

The strongest malt vinegar is termed No. 24., or *proof vinegar*, and is estimated to contain 5 per cent. of real acetic acid: but ordinary vinegar does not contain much more than 4·5 per cent.

Preparation.—When a solution of sugar is mixed with yeast, it undergoes a certain change, termed *fermentation*, and becomes converted into alcohol. (See Spiritus.) If this process is not checked it continues to proceed, and the alcohol is converted into acetic acid by the absorption of oxygen from the air, which combines with part of its hydrogen and forms water, while the remaining constituents of the alcohol become differently combined and form acetic acid.

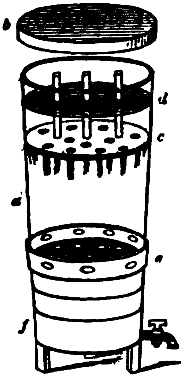
	C.	H.	O.			C.	H.	O.
2 eqs. alcohol	4	6	2	these are differently combined and form	1 eq. acetic acid	4	3	3
4 eqs. oxygen (from the air)	0	0	4		3 eqs. water	0	3	3
	4	6	6			4	6	6

Methods of Vinegar-making.

English (common).—An infusion of malt is fermented as in making beer, and is then placed in large vats open to the air. These are kept at a high temperature, and by the gradual absorption of air continued for many weeks, the change into acetic acid is slowly effected. Before the end of the process the liquor is poured into larger tuns, containing in the bottom the refuse from the manufacture of British wines, which consist of crushed raisins and other fruits, and is technically denominated *rape*, by which the acetous fermentation is hastened and completed.

German.—A much quicker method has been lately invented in Germany, of which, however, the principle is still the same. The large tub (*a*, *fig*. 9.) is covered with a loosely fitting lid, *b*; and near the top is a shelf, *c*, pierced by numerous holes, which are filled with bundles of thread or cotton hanging down into the tub. The shelf is also perforated to admit a number of tubes opening above the surface of the alcoholic liquid, which is poured upon it till it rises to *d*. The middle of the tub is filled with chips of beech or some hard wood; and near the bottom are six or eight holes, *e*, in the sides of the tub, which admit air from without. The alcoholic liquor trickles down the threads, and then falls upon the chips, by which means an extensive surface is exposed to the air. This enters by the holes, *e*; and the oxygen combining with the liquor forms acetic acid and water as above described, which collect in the lower part of the tub at *f*. The conversion of the alcohol into acetic acid is accompanied with a great evolution of heat, which, expanding the air in the upper part of the tub, causes it to rise through the tubes in the shelf, *c*, and to escape from under the lid, by which means there is a constant current of air entering at the holes, *e*, and thus furnishing an abundant supply of oxygen. By this method the alcoholic liquor is converted into vinegar in about thirty-six hours, instead of requiring many weeks as in the old way.

Fig. 9.



Second German method.—This is essentially different in arrangement from the last, and its success depends upon the affinity of alcoholic vapour and air for perfectly pure platinum, and the mutual affinity of the first two for each other. Plates of perfectly pure platinum, or trays containing spongy platinum, are suspended in a close vessel, the bottom of which is covered with the alcoholic liquor. This rises in vapour, on the application of heat; and the vapour adheres to the surface of the platinum. There is also a strong affinity between the air in the vessel and the platinum, by which its oxygen is brought so closely in contact with the alcoholic vapour that they come within the sphere of their mutual chemical affinities, and acetic acid and water are formed, and drop from the platinum into the vessel below. This process continues until the oxygen in the vessel is exhausted, when it must be opened, and a fresh supply of air admitted. The combination is accompanied with so much heat that the platinum frequently becomes red hot. —*Daniell.*

Characters and tests.—Yellowish colour, of peculiar odour; its specific gravity is 1·019. A fluid ounce of vinegar is neutralized by a drachm of crystals of carbonate of soda. After ten minims of solution of chloride of barium (see p. 59.) have been added to a fluid ounce of vinegar, nothing further is thrown down, if more of the chloride is added to the strained vinegar; hydrosulphuric acid being transmitted, the colour is not changed.

The specific gravity of vinegar is not a sufficient test of its strength, owing to the variable quantity of mucilage present; its saturating power is therefore added. If there is any precipitate on the second addition of chloride of barium, it proves that there is too much sulphuric acid. If the vinegar has been kept in a metallic vessel, it will be coloured by the hydrosulphuric acid.

Medicinal properties and uses.—See Acetum Destillatum.

ACETUM DESTILLATUM, *L. E.*

Distilled Vinegar.

Take of vinegar a gallon.
Let seven pints distil from a sand-bath.

Process.—By distillation the vinegar is freed from its colouring matter and most of the mucilage, and from the sulphates of the water; but it acquires a slight empyreumatic flavour, which makes it less agreeable than common vinegar. It consists of acetic acid, a little alcohol and mucilage, with a good deal of water. The worm ought never to be made of metal, whatever the body of the still may consist of.

Characters and tests.—Its specific gravity is 1·0065 (1·005, *E.*). A fluid ounce is neutralized by 57 grains of crystals of carbonate of soda.

These tests show its strength. It ought not to produce a precipitate with chloride of barium, or to be coloured by hydrosulphuric acid. The first would show fraudulent sulphuric acid; and the second that a metallic worm had been used, which had produced a metallic impregnation.

Medicinal properties.—Common or distilled vinegar is *refrigerant*, *sedative*, and *astringent.* When taken in small quantities it promotes digestion during health, and in a feverish condition of body, it lowers the pulse and the animal heat. When taken habitually in large quantities, it impairs the appetite and the digestive powers, and causes loss of flesh.

Uses.—In *fever*, as a refrigerant drink diluted with water. In *hæmorrhages*, both internally, to reduce the circulation, and externally, for its astringent powers. In *phthisis* it allays the fever, and checks the diarrhœa and sweating. In *scurvy*. In cases of *phosphatic deposits in the urine*. In all these cases, however, vinegar is much less frequently used than the stronger mineral acids. It is much employed in cases of poisoning by narcotics, to relieve the cerebral symptoms. The stomach should always be first emptied by an emetic. In poisoning with the mineral alkalies, it is the best and safest antidote.

Externally it is applied as an astringent to bleeding surfaces. In fevers and some of the exanthemata, great relief is afforded by sponging the skin with vinegar diluted with tepid water, and also in the profuse sweating which sometimes occurs towards the close of valvular disease of the heart. It forms an ingredient in many cold lotions, and is applied undiluted to bruises, to prevent the occurrence of swelling, or ecchymosis. Largely diluted, it is used to remove particles of lime which may be in the eye.

Pharmaceutical uses.—Vinegar is an excellent solvent of the active principles in many plants, and is used as the menstruum for their extraction.

Dose.—f ʒjss to f ʒij or f ℥ss. In lotions, f ℥j to f ℥iij in the half-pint.

Officinal preparations.—None in the Ph. L. (Acet. Colch., A. Opii, A. Scillæ, *E.*).

ACETUM GALLICUM, *D. E.*

FRENCH VINEGAR.

Properties.—This vinegar is prepared from wine, and has a finer flavour and odour than British vinegar: it is generally a little stronger also. It is distinguished from British by producing, first, a slight purple muddiness, and slowly a purplish precipitate, when ammonia is added in excess. (*Ph. Ed.*) Sp. gr. 1014 to 1022.

Uses.—The same as those of common vinegar.

ACETUM CANTHARIDIS, *L. D. E.* (*Epispasticum.*)

VINEGAR OF CANTHARIDES. (*Epispastic.*)

Take of Cantharides, rubbed to a very fine powder, two ounces; Acetic acid, a pint.

Macerate the cantharides with the acid for eight days, frequently shaking. Lastly, press and strain.

Edin. Canth. ℥iij. Acid. acet. (sp. gr. 1·063 to 1·068) f℥ v. Pyrolig. acid (sp. gr. 1·034) f℥xv. Euphorbium, ℥ss.
Macerate 7 days. Strain, express, and filter.

Dub. Canth. ℥iv. (avoir.) Acid. acet. (sp. gr. 1·066), f℥iv. Acid. acet. of commerce (sp. gr. 1·044), f℥xvi.
Macerate for 14 days. Strain, express, and filter.

Remarks.—The acetic acid dissolves the active principle of the cantharides, which is thus obtained in a concentrated form. When applied to the skin by means of a camel's hair pencil, it raises a blister in a few minutes, and is useful when our object is to produce vesication as quickly as possible, or to avoid the annoyance of a plaster. Thus, in mania, when the patient would tear off the plaster, or in cerebral affections, in which it is difficult to retain it upon the scalp, this preparation is valuable, though it frequently fails in producing the desired effect. Mr. Redwood (*Pharm. Jour.*) says, that acetic acid cannot dissolve cantharides, and that the preparation never succeeds if made of the pharmacopœial acid. If made of the glacial acetic acid, or Beaufoy's strongest acid, it will then raise a blister; but that the acid produces this effect by itself, and therefore the addition of the cantharides is useless.

In order to test this statement, Mr. Abraham has carefully prepared some Acet. Canth. with acid of the Pharmacopœial strength, and it has never failed in my hands to produce a blister.

ACETUM COLCHICI, *L. D. E.*

VINEGAR OF MEADOW SAFFRON.

Take of Meadow saffron cormus, dried, three drachms and a half.
Dilute acetic acid, a pint.
Proof spirit, a fluid ounce and a half.

Macerate the meadow saffron with the vinegar, in a covered vessel, for three days; afterwards press and set it by, that the dregs may subside. Lastly, add the spirit to the strained liquor.

D. Colchicum bulbs, *dried and bruised*, ℥j (avoir.). Acetic acid of commerce (sp. gr. 1·044), f℥iv. Distilled water, f℥xii.
Macerate 7 days. Mix, strain, &c.

E. Colchicum bulb, *fresh*, ℥j. Distilled vinegar, f℥xvi. Proof spirit, f℥j.
Macerate in the vinegar for 3 days; strain, filter, and add spirit.

In the last Pharmacopœia the fresh cormus was ordered, but in the present one the dried is directed, by which means a preparation of more uniform strength is obtained, and one which can be prepared at any period of the year. The quantity now ordered corresponds with the directions in the old Pharmacopœia, making allowance for the loss of weight by drying.

The Edinburgh preparation is the same strength as that of London, making allowance for the employment of the fresh cormus instead of the dry: *but the Dublin preparation is three times the strength.*

This preparation soon deposits a sediment, which does not appear to contain any active principles. The proof spirit is employed to prevent decomposition. Sir C. Scudamore considers this the mildest and most efficient preparation for gout. It should be combined with magnesia or the carbonate, which neutralises the acid, and forms at the same time a laxative salt. The colchicum exists as an acetate in this preparation.

Dose.—f℥ss to f℥i, or one third this dose of the Dublin preparation.

COLCHICUM AUTUMNALE.

Meadow Saffron. (Melanthaceæ; Hexandria, Trigynia.)

Description.—The *cormus* (*bulb*, E.) of meadow saffron is about an inch and a half long and an inch thick; round on one side, and flattened on the other, with a slight longitudinal groove down its flat side. It is roundish inferiorly, but tapers slightly towards the top, from which the stem arises. It is brown externally, but white internally, and is solid, and not composed of rings like the onion. The leaves appear in spring, and generally die before the flower is developed, which takes place in July or August, at which time the cormus is fully formed, and should be collected, as its medicinal properties are most active, before being exhausted by the flowering of the plant, and the ripening of the seed.

The *seeds* are small, brown, hard, and numerous, about the size of black mustard, and intensely bitter. They are ripened under ground, in a seed-vessel, which is some inches below the surface; the flower appearing in autumn, and the seeds being ripe the following spring or summer.

Ph. L.—The cormus is to be dug up in the month of July, or before the autumnal bulb has swollen. Cut it transversely into thin slices, the dry rind being taken off; and dry it by a heat, gentle at first, but afterwards slowly increased to 150°.

Bulbs and Seeds for which Colchicum may be mistaken.

Bulbs.—*Onions*, or very small *Squills*. Colchicum is distinguished from these by being *solid* when cut transversely, and not composed of rings or scales; and by having a slight notch on one side when dried. *Seeds. Black Mustard* and *Digitalis*. Their bitterness distinguishes colchicum from the former, and they are three or four times the size of the latter.

Composition. — Veratria (*Pelletier* and *Caventou*); Colchicia (*Hesse* and *Geiger*). Colchicia somewhat resembles veratria in its properties; but they are distinguished by the following characters. Colchicia is crystalline; veratria is not. Colchicia is soluble in water; veratria is not. Colchicia does not cause sneezing when applied to the mucous membrane of the nose; but veratria causes the most uncontrollable sneezing, when applied even in the smallest quantity.

The seeds have not been examined with care; but they contain more of the active principles of the plant, and are more uniform than the dried or fresh cormus. The active principle resides in the husk of the seeds, and these should therefore be employed whole and uncrushed, for preparing the tincture (*Dr. A. T. Thomson*).

Vinegar, proof spirit, and wine extract the active properties; and there are officinal preparations made with each of these.

Medicinal properties. — *Diuretic*, *cathartic*, *sedative*, *and acrid narcotic*. When taken in *poisonous doses* colchicum causes great prostration, violent inflammation of the bowels, purging, and vomiting; sometimes suppression of urine, and headache, stupor, and death. These latter symptoms are not uniformly noticed. In one case mentioned by Henderson, nearly all the joints became acutely painful, being extremely sensitive to the slightest pressure, combined with which was acrid sweat, thus closely resembling an attack of rheumatic fever.*

In *medicinal doses* it generally, but not always, lowers the pulse, causes great depression, nausea, and sometimes severe vomiting; frequent purging, the stools being liquid and green, and resembling in appearance green pea-soup; diuresis, and frequently sweating; with pain in the forehead or throughout the head. It is said to cause an increased quantity of uric acid in the urine; but this is not uniformly the case, as it is sometimes considerably diminished. It acts in some cases as an anodyne, allaying very speedily the intense pain of a gouty paroxysm.

Uses.—In *gout* colchicum has been considered specific; but though it allays the pain, and produces temporary benefit, in nearly all cases, in only a few is a permanent cure effected (*Scudamore*). It is said to increase the liability to more severe attacks; but there is not much evidence of the truth of this statement. It is beneficially combined with saline purgatives in the treatment of the disease:

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* Med. Gaz. vol. xxiv. p. 763

and frequently affords the most speedy and remarkable alleviation of the pain. In *acute rheumatism* it is very generally employed, but its good effects are not so certain as in gout. It is principally useful in that form which attacks the synovial membranes; and, in the opinion of many physicians, it does not produce its curative effects until its action upon the bowels is freely established. It is more efficacious in proportion as there is more of a gouty diathesis combined with the rheumatism; and it is hence of much greater service in the acute rheumatism of London draymen, brewers' servants, and navigators, than of people who have lived in the country, and taken little beer or spirits. Dr. Wigan considers it almost infallible, if given in the dose of eight grains of the powdered cormus every one or two hours, until the stomach cannot possibly retain any more. It then excites the most distressing vomiting and purging for a few hours, which are followed by sweating and irresistible sleepiness; from which the patient wakes free from pain. The desirable result is generally obtained in about thirty-six hours from the commencement of the treatment.* Craigie advises the combination of ♏xv, or ♏xx, of liq. opii sedativ. with ♏xxx or ♏xl of the wine of colchicum, every three or four hours. This generally prevents sickness, and is equally efficacious in allaying the pain. In *chronic rheumatism*, except so far as there is a gouty complication, it frequently disappoints our expectations. In *acute synovitis* it is beneficially employed. In the first stage of *acute gonorrhœa* it is strongly recommended by Mr. Key, in doses of ♏xxx, or ♏xl, of the tincture of the seeds.† In *chordee*, Sir B. Brodie has found much benefit from fʒiss of the tincture.‡ In *dropsies*, especially *hydrothorax*, it has been used, and is still employed on the Continent; but in this country it is superseded in these diseases by other diuretics, which are more uniform in their effects. In *humoral asthma* and *other chronic bronchial* affections, especially if accompanied with anasarca, Pereira has found it of much use.§ Dr. Laycock, of York, advises the external application of the undiluted tincture as a liniment, in rheumatism and lumbago.‖

Dose and administration. — Of the *dried* and *powdered cormus* gr. ij to gr. viii (*Wigan*). Its effects must be very carefully watched when given in such doses. Of the *vinegar*, fʒss to fʒj; of the *tincture*, ♏xxx to fʒj or fʒiss. Of the *wine*, ♏xxx to fʒj. Of the *extract*, gr. j to gr. iij.

Officinal preparations of colchicum. — Acetum Col. *L. E. D.* Ext. Col. *L.* Ext. Col. Acet. *L. E. D.* Tinct. Col. *L. E. D.* Tinct. Col. Co. *L.* Vin. Col. *L. E.*

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* Med. Gaz. June 30. 1838.

† MS. Lectures.

‡ Lancet, 1838-9, vol. ii. p. 337.

§ Mat. Med. vol. ii. p. 947.

‖ Med. Gaz. vol. xxiii. p. 899.

ACETUM OPII, *E. D.*

VINEGAR OF OPIUM.

D. Opium ℥iss (avoir.); Acid. Acet. Dil. Oj.

E. Opium, ℥iv; Distilled vinegar, f℥xvi.

Macerate for seven days in a closed vessel, occasionally agitating it. Strain, express, and filter.

Remarks. — This is a valuable form of opium, which appears to affect the head less than some other preparations. It can sometimes be borne in fever, when the tincture occasions feverishness and headache, which prevent its use.

Dose.—The proportions of opium and acid in the Dublin Acetum Opii are the same as those of opium and spirit in the London Tinctura Opii, and the dose is the same, ♏ii to ♏xxx or ʒi, according to the object with which it is given.

The Edinburgh preparation is more than three times as strong, and the dose will therefore differ in proportion.

ACETUM SCILLÆ, *L.D.E.*

VINEGAR OF SQUILL.

Take of Squill, freshly dried and bruised, two ounces and a half.
Dilute acetic acid, a pint.
Proof spirit, a fluid ounce and a half.

Macerate the squill in the acid with a gentle heat in a closed vessel for three days; then press and set aside, that the dregs may subside. Lastly, add the spirit to the strained liquor.

Ed. Dried squill, ℥v. Distilled vinegar, Oij. Proof spirit, f ℥iij.

Macerate for seven days in the vinegar. Strain and express the liquid. Add the spirit and filter.

Dub. Squill, dried and bruised, ℥ij. (avoir.) Acetic acid of commerce (sp. gr. 1·044), f ℥iv. Distilled water, f ℥xii.

Mix the acid and water. Macerate for seven days. Press, strain, and filter.

Description, medicinal properties, and uses.—See OXYMEL SCILLÆ.

Remarks. — Vinegar dissolves the active principle of the squill. This is a good form for the administration of this drug, for it is generally desirable to avoid giving a stimulant whilst prescribing squill, and the acetic acid in some degree aids its medicinal effects.

It should not be kept in very large quantities, as it is liable to decompose and deposit a copious sediment if long kept. The addition of the proof spirit is intended to prevent this. It is important that the direction to use *recently dried* squill should be attended to, as it so quickly absorbs moisture from the air, that a quantity much less than that required might be used if the damp, and consequently heavier bulb were taken instead of the dry. If it has become damp, a short exposure to the heat of a cool oven will dry it, and make it fit for use.

Dose.—♏xx to ♏xl. The three Pharmacopœias agree in strength.

Officinal preparation.—Oxymel Scillæ.

ACIDUM ACETICUM, *L. D. E.*

Acetic Acid.

Synonyme.—Acid: Acet. e Ligno Venale, Purified. Pyroligneous Acid, *D.*

No directions are given in the present Pharmacopœia for the manufacture of this acid, the College being content with indicating its proper strength. By the distillation of wood, especially hard woods, such as beech and oak, a strong acetic acid is obtained, called *Pyroligneous acid.* As obtained from this source it is, however, very impure, containing creosote, picamar, and a variety of empyreumatic products, from which it is separated by a complicated series of evaporations and neutralisations. The acid which remains is combined with carbonate of soda, and forms an impure acetate, which is purified by repeated solutions and crystallisations. This acetate is not used medicinally, and is only employed as the source from which pure concentrated acetic acid may be obtained. It is a colourless salt, usually in small crystals, the *primary form* of which is an *oblique rhombic prism.* It has a sweetish taste.

Composition.—Acetate of soda consists of—

1 eq. soda, 32; 1 eq. acetic acid, 51; 6 eqs. water, 9×6, 54;

$$= NaO,\bar{A}(C^4H^3O^3),\ 6\,HO,\ \text{eq. } 137.$$

Process.—When diluted sulphuric acid is heated in contact with acetate of soda, the salt is decomposed, and the acetic acid, being volatile, is driven off along with the water, whilst the sulphuric acid combines with the soda, and forms sulphate of soda, which remains dry in the retort.

$$\begin{array}{lll}\text{Acetate of soda}\left\{\begin{array}{l}\text{Acetic acid.}\\ \text{Soda}\end{array}\right. & & \text{Acetic acid}\uparrow.\\ \text{Sulphuric acid} & \longrightarrow & \text{Sulphate of soda.}\end{array}$$

The heat at the close of the process must be moderate, lest the latter portions of the acetic acid should be decomposed, and empyreumatic compounds obtained instead of the pure acid.

Characters and tests.—Free from colour, of a very pungent odour. Its sp. gr. is 1·048 (1·044 *D.*, 1·063 to 1·068·5 *E.*): it flies off by heat in vapour. Nothing is precipitated from it on the addition of nitrate of silver, or chloride of barium. Silver leaf being digested in it, and hydrochloric acid afterwards dropped in, nothing is precipitated. Its colour is not changed by hydrosulphuric acid, or ammonia, or by ferrocyanide of potassium added after the ammonia. 100 grains of this acid are neutralised by 87 grains of crystals of carbonate of soda.

(100 minims neutralise at least 216 grains of carbonate of soda, *E.*)

Impurities.—This acid may be too weak; it may be fraudulently adulterated with sulphuric, muriatic, or nitric acid; or it may have become impregnated with some metal, by standing in a metallic vessel, or by the use of a metallic worm. The first is guarded against by the exact quantity of carbonate of soda requisite for neutralisation being given; the second by the absence of precipitate from chloride of barium; and muriatic acid, if present, would produce a precipitate with nitrate of silver. It is intended to guard against nitric acid by directing silver leaf to be digested in it, which it is supposed will be dissolved, and form nitrate of silver, if any nitric acid is present. The subsequent addition of hydrochloric acid would then produce a precipitate of chloride of silver. I find, however, that when silver leaf is digested for some days in acetic acid containing even 3 per cent. of nitric acid, none of the silver is dissolved. The same acid however instantly showed the presence of nitric acid on using Berthemot's test of brucia. (See NITRIC ACID, *Tests.*) If copper were accidentally present from the worm, &c. hydrosulphuric acid would cause a brown colour, ammonia a blue one, and ferrocyanide of potassium a brown one.

Composition.—Anhydrous acetic acid consists of

4 eq. carbon=24; 3 eq. hydrogen=3; 3 eq. oxygen=24;=A, or $C^4H^3O^3$, eq. 51.

Acetic acid cannot exist unless combined with water or a base. The strongest acid that can be obtained is termed *glacial* acetic acid, from becoming solid and crystalline at about 40° F. It consists of 1 eq. of acetic acid and 1 eq. of water: $\bar{A}+HO$, eq. 60.

One hundred grains of the pharmacopœial acid neutralise 87 grains of crystallised carbonate of soda, which require 30·8 grains of anhydrous acetic acid. This acid, therefore, consists of anhydrous acetic acid, 30·8; water, 69·2=100.

The sp. gr. is stated to be 1·048, and is intended as an index of its strength. In the case of this acid, however, the sp. gr. is not a true measure of the amount of anhydrous acid present, since condensation takes place in unequal degrees, on mixing various proportions of acetic acid and water. It is, however, in some degree an indication of its strength, as it continues to rise, though not with perfect uniformity to a certain point; after which it again diminishes, as shown in the following table by Dr. Thomson*:

Acid.		Water.	Sp. Gr. at 60° F.	Acid.		Water.	Sp. Gr. at 60° F
1 eq.	+	1 eq.	1·06296	1 eq.	+	5 eq.	1·06820
1 „	+	2 „	1·07060	1 „	+	6 „	1·06708
1 „	+	3 „	1·07080	1 „	+	7 „	1·06349
1 „	+	4 „	1·07132				

and with increasing dilution the sp. gr. continues to fall.

The only accurate measure of the strength of the acid is, therefore, its saturating power, which is also mentioned in the notes.

The *Acetic acid of the Edinburgh Pharmacopœia* is obtained from acetate of lead, by means of sulphuric acid, and is the pure glacial acid, being about three times as strong as the London acetic acid.

Medicinal properties.—Strong acetic acid is seldom given internally, but it may be used, when properly diluted, in the cases mentioned under ACETUM DESTILLATUM. When applied externally it is an active counter-irritant; and, in a somewhat more concentrated form than that directed by the Pharmacopœia, it even causes vesication. It is a solvent of the active principles of many medicinal substances, and is frequently used for this purpose. The acid of the pharmacopœial strength never raises a blister.

Uses.—Acetic acid is sometimes applied with a sponge for the cure of ringworm, in which case it causes acute but temporary pain, and produces a superficial destruction of the diseased parts. Its curative effects are sometimes speedy. Dr. Stokes and Dr. Hughes speak very highly of a liniment composed of this acid and oil of turpentine, as a counter-irritant in the early stages of phthysis pulmonalis. They remark that much more benefit is derived from its employment than can be ascribed to the counter-irritation alone, and imagine that it renders the patient less susceptible of atmospheric changes. The proportions may be one part of acetic acid and two parts of oil of turpentine.

Officinal preparations.—Acid. Acet. Camph. *E.*, Acid. Acet. dilut., Acet. Canth.

ACIDUM ACETICUM CAMPHORATUM, *E. D.*

CAMPHORATED ACETIC ACID.

Ed. Take of Camphor, ℥ss.
Acetic acid, f℥viss.
Rectified spirit, q. s.

Dub. Camph ℥j (avoir.), Acid. Acet. Forte (sp. gr. 1066) f℥x., Rectified spirit, f℥j.

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* Quoted by Turner, Chem. 5th Ed. p. 797.

Pulverise the camphor with the aid of the spirit, and then dissolve it in the acid.

Medicinal properties and uses. — A stimulating embrocation for bruises and chronic swellings.

ACIDUM ACETICUM DILUTUM, *L. D.*

Dilute Acetic Acid.

Take of Acetic acid (sp. gr. 1·048), twenty-three fluid drams.
Distilled water, a pint.

Add sufficient of the water to the acid, that the mixture may measure a pint.

Dub. Acet. Acid of commerce (sp. gr. 1·044), Oj.
Distilled water, Ovii. Mix.

The specific gravity is 1·008 (1·006, *D.*). A fluid ounce is neutralised by 57 grains of crystallised carbonate of soda.

This is intended to correspond in strength with distilled vinegar. The London acid is a little stronger than that of Dublin.

Officinal preparations. — Liq. Am. Acet. *L. D.* Acet. Opii, *D.* Empl. Ammoniaci, *L.*

ACIDUM ACETICUM FORTE, *D.*

See Acidum Aceticum, p. 71.

Take of Glacial Acetic Acid, f℥vi; Distilled water, f℥iv. Mix. Sp. gr. 1066.

ACIDUM ACETICUM GLACIALE, *D.*

Glacial Acetic Acid. See Acidum Aceticum, p. 71.

This acid is obtained by acting upon acetate of lead by dry muriatic acid gas, and distilling the product. It is only used for making the acetic acid by diluting it with water, and the process is too troublesome and expensive to be adopted in practice.

ACIDUM BENZOICUM, *L. D. E.*

BENZOIC ACID.

Synonyme. Flores Benzöini.

The present Pharmacopœia does not give any directions for its preparation, and the following are taken from the old edition.

Take of Benzoin a pound.

Put the benzoin into a proper vessel placed in sand, and the heat being gradually raised, sublime until nothing more rises. Press what is sublimed, wrapped in bibulous paper, and separate it from the oily part; afterwards again sublime it.

Remarks. — Benzoin is elsewhere described. (See TINCTURA BENZOINI COMPOSITA.)

Process. — Benzoin consists of Resin, and some unimportant ingredients, and Benzoic acid. This acid may be separated either, as here directed, by simple heat, or by boiling it with lime. In the former case it is sublimed in beautiful white silky crystals; in the latter, it combines with the lime, and forms benzoate of lime, from which it may be separated by the addition of hydrochloric acid. This dissolves the lime, and the benzoic acid is left free.

It is probable that the whole quantity of acid which is obtained by heat from benzoin does not naturally exist in a free state in the balsam; for if boiled with lime or soda until no more acid is separated, the remaining balsam, when dried and heated, yields a further supply. From this it is probable that the acid is partly formed in consequence of a different combination of the elements of the benzoin, occasioned by the influence of heat. At the same time that the acid is sublimed, a quantity of empyreumatic oil is also volatilised, and adheres to it, rendering it impure. To separate this oil, the acid was formerly wrapped in bibulous paper, which absorbs it. A more elegant and efficacious plan is, to tie a sheet of blotting-paper over the mouth of the crucible, and place a paper cone above this, in which the acid may be collected. Whilst in a state of vapour, it passes through the bibulous paper, and the adhering oil is thus entirely separated, and the acid forms beautiful long, slender, silky, needle-shaped crystals, in the paper cone. The experiment may be performed with the utmost ease, by putting a small piece of benzoin into the bowl of a common tobacco pipe, tying a piece of blotting-paper over the mouth, covering this with a small cone of paper, and placing the whole for a few minutes over a gas lamp.

Composition. — Benzoic acid consists of

14 eqs. carbon, 84; 5 eqs. hydrogen, 5; 3 eqs. oxygen, 24;
1 eq. water, 9;=$\bar{B}$, or $C^{14} H^5 O^3 + HO$, eq. 122.

It is supposed to be a compound of oxygen and a base termed benzule — $C^{14} H^5 O^2$; and there are many curious hypothetical speculations respecting it; but they have so little connection with medicine, as to require no further notice in this place.

Characters and tests. — Benzoic acid is white or nearly so. It flies off on the cautious application of heat, exhaling its peculiar odour. It dissolves sparingly in water (1 part in 200), but abundantly in rectified spirit. It is also dissolved by ammonia, or solution of potash, soda, or lime, from which it is thrown down by hydrochloric acid.

Medicinal properties. — When taken internally, it acts as a stimulant to the mucous membranes, promoting the expectoration, and diminishing the secretion of mucus. Whilst passing through the digestive and circulating systems it is converted into hippuric acid, and is excreted by the kidneys in this form. It was at one time supposed that it might be useful in diseases, such as gout, uric acid gravel, and rheumatism, in which there is an undue secretion of uric acid in the system; but experience has shown that the quantity of uric acid remains unaffected notwithstanding the administration of benzoic acid, and it is no longer used in these cases.

Uses.—Benzoic acid is seldom or never used alone. The chief preparation into which it enters is the compound tincture of Camphor.

Dose. — If used alone, gr. ij to gr. v.

Officinal preparations. — Tinct. Camph. co. *L.* Tr. Opii Ammoniata, *E.* Tr. Opii Camph. *E. D.*

ACIDUM CITRICUM, *L. D. E.*

Citric Acid.

The present Pharmacopœia gives no directions for the preparation of this acid; the old ones are therefore repeated in the present instance.

Take of Lemon Juice, four pints.
Prepared chalk, four ounces and a half.
Diluted sulphuric acid, twenty-seven fluid ounces and a half.
Distilled water, two pints.

Add the chalk gradually to the lemon juice made hot, and mix. Set by, that the powder may subside; afterwards pour off the supernatant liquor. Wash the citrate of lime frequently with warm water. Then pour upon it the diluted sulphuric acid and the distilled water, and boil for a quarter of an hour. Press the liquor strongly through a linen cloth, and strain it. Evaporate the strained [liquor] with a gentle heat, and set it by, that crystals may be formed.

Dissolve the crystals, that they may be pure, again and again in water, and as often strain, boil down, and set aside.

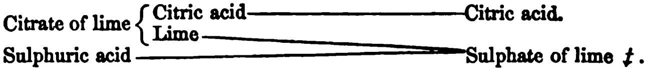
Lemons contain a large quantity of citric acid dissolved in their juice, to which are owing their refrigerant properties and agreeable acid flavour. The rind contains an aromatic volatile oil, which communicates its flavour to water or spirit in which it is macerated. The oil is used chiefly on account of its odour. Lemons themselves are more frequently used in cookery than in medicine; but the properties which have been named render the juice an agreeable refrigerant when added to barley water, or other bland fluids, in fever. The oil is considered to be a good anthelmintic for tape-worm.

Lemon juice is by far the most important portion of the lemon, and consists chiefly of citric acid and mucilage dissolved in coloured water. This mucilage prevents the acid from crystallising, even when the juice has been evaporated to a sufficient degree. One important object, therefore, in the process for obtaining the acid, is the separation of the mucilage and colouring matter.

Process.—Chalk consists of carbonic acid and lime. When added to hot lemon juice, it is decomposed; the carbonic acid flies off with effervescence, and the lime combines with the citric acid of the juice, forming an insoluble citrate of lime, which gradually falls to the bottom. It carries down with it some of the mucilage and colouring matter, and is therefore not quite pure; but the greater portion remains dissolved in the water, and is removed by pouring off the liquid from the precipitate. In order to purify the citrate of lime, it is frequently washed with warm water, which removes all the adhering mucilage and colouring matter, and leaves the salt pure and nearly white.

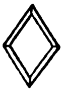
Chalk - -	Carbonic acid ——	Carbonic acid gas ↑.
	Lime ——	
Lemon juice -	Citric acid ——	Citrate of lime ↓.
	Water and mucilage ——	Water and mucilage.

Whilst this citrate of lime is still moist, it is easily decomposed when boiled with dilute sulphuric acid, which combines with the lime, and forms the almost insoluble sulphate of lime. The citric acid remains dissolved in the water, and, being poured off, is evaporated until crystals begin to form. They are at first not quite colourless, but become so by the repeated solutions and evaporations directed for their purification.



When prepared in this manner a good deal of mucilage and colouring matter is carried down with the precipitated citrate of lime, and is separated with difficulty, requiring repeated crystallisations and re-solutions. Dr. Price has proposed a plan which is said to render the separation of these impurities more easy and complete. It is described at great length in the Ph. Jour.*, but the general outline of the plan is the following. A *soluble* salt of citric acid is formed in the first instance by saturating the lemon juice with ammonia from gas liquor, after which the greater part of the impurities may be separated by filtration. This citrate of ammonia is then decomposed by a solution of chloride of calcium; citrate of lime being precipitated, and a further quantity of mucilage and colouring matter left behind in solution. This citrate of lime is then decomposed by sulphuric acid as before.

Properties.—Citric acid is colourless, very sour, but without any flavour of lemon juice, and without odour. The *primary form* of the crystals is a *right rhombic prism.* The usual appearance of a perfect crystal is similar to the drawing, and the small diamond-shaped surface may generally be seen in common well-made crystals. They are very soluble in water, requiring less than their own weight of cold, and only half their weight of boiling water for solution. They also absorb moisture slightly in a damp atmosphere, and from this circumstance soon lose their sharp angles, and assume a generally rounded character.



Composition.— Citric acid consists of

$$4 \text{ eqs. carbon, } 24\text{; } 2 \text{ eqs. hydrogen, } 2\text{; } 4 \text{ eqs. oxygen, } 32\text{; } = \overline{\mathrm{C}}, \; C^4 H^2 O^4, \text{ eq. } 58.$$

The crystals contain water of crystallisation, and usually consist of

$$3 \text{ eqs. citric acid} + 4 \text{ eqs. water; } = \overline{\mathrm{C}} + \tfrac{4}{3} \; HO\text{; eq. } 70.$$

℥xjss of the crystals, dissolved in Oj of water, is about equal to a pint of lemon juice. One drachm of the crystals saturates nearly two drachms of crystallised carbonate of soda. In the following table are shown the quantities of acid required to neutralise a scruple of the respective alkalies.

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* Ph. Jour. Jan. 1854.

A Scruple of	Lemon Juice.	Citric Acid.
Bicarbonate of potash	fʒiijss	gr. 14.
Bicarbonate of soda	fʒiij	gr. 12.
Sesquicarbonate of ammonia	fʒvj	gr. 24.

Characters and tests.—Citric acid is colourless, and disappears entirely, or almost entirely, in the fire (if air has free access to the acid). It is dissolved by water and by spirit. What is thrown down from solution of acetate of lead is dissolved by nitric acid. No salt of potash, except the tartrate, precipitates anything. Added in small quantities to cold lime-water, it does not make it turbid. 100 grains dissolved in water are neutralised by 205·7 grains of crystals of carbonate of soda.

Edin. A solution in four parts of water is not precipitated by carbonate of potash. When incinerated with the aid of red oxide of mercury, no ash is left, or a mere trace.

Adulterations.—Citric acid is frequently adulterated with tartaric acid, and sometimes with sulphuric acid. If any tartaric acid is present, a precipitate, which is bitartrate of potash, is formed on the addition of chloride of potassium to a strong solution of the acid. If no tartaric acid is present, there is no precipitate. If sulphuric acid is present, a white precipitate is thrown down on the addition of acetate of lead, which is not redissolved by nitric acid. Citric acid itself forms a precipitate with the acetate, but this is dissolved by nitric acid. The entire destruction by heat shows the absence of lime derived from careless preparation.

Crystals which may be mistaken for citric acid.— *Tartaric acid.* The crystals of T are *longer*, and *not* so *transparent:* their fracture is more like that of broken glass, and their *edges* are generally *sharper*. The test above mentioned distinguishes them effectually.

Medicinal properties of lemon juice. — *Refrigerant and antiscorbutic.* It is liable to spoil if long kept exposed to the air; and is therefore mixed with about a tenth of its weight of brandy, in order to preserve it for use in the navy.

Uses. — In *fever*, and most febrile affections, lemon juice is used as a pleasant refrigerant addition to diluent drinks, and to make effervescing draughts. Its chief value is in the prevention and cure of *scurvy*, and it is supplied to all ships, when bound on long voyages, in large quantities. One or two ounces of the juice, twice or three times a week, is a preventive dose, and four or six ounces daily will cure the disease when it has appeared. Lime juice is frequently substituted for lemon juice. It is doubtful whether citric acid is as efficacious as the fresh juice; and scurvy is now so rare a disease that it is difficult to make experiments which will prove it. A most important application of lemon juice is that proposed by Dr. Owen Rees for the treatment of *acute rheumatism and gout.* I shall describe it in his own words:—"It is principally owing to the very surprising effects which I have observed from the use of lemon juice in the treatment of rheumatic gout, that I have been induced to notice this case (case reported). I have been now for several months in the habit of prescribing the remedy with such marked, and I may add rapid benefit, that I am unwilling to delay bringing it before the notice of practitioners. The early relief from pain was such, that had any one unacquainted with the remedy in use watched the case, they would almost inevitably have concluded that sedatives had been resorted to.

"I first had recourse to lemon juice for the cure of rheumatic gout, from a belief that the vegetable acids (probably owing to the excessive quantity of oxygen entering into their composition) contributed to effect the transformation of the tissues generally, and because lemon juice was the most palatable form in which such class of remedies could be applied. Moreover, it appeared probable that the supernitrate contained in the juice, though in small quantity, was a form of alkaline salt likely to contribute to the alkalinity of the blood in its transformation; knowing, as we do, from the examination of urine, that such organic compounds become converted into carbonates during digestion and circulation."*

In numerous cases related by Dr. Rees, the benefit derived from the remedy confirmed his first impression; but the urine did not become alkaline. On the contrary, in one, it became acid, having been alkaline previous to the use of the lemon juice.† After experimenting upon it still further, Dr. Babington records that "the juice produces no very decided effect upon the kidneys, merely tending by its quantity to promote the secretion. It somewhat increases cutaneous action. The only unequivocal effect which uniformly takes place is a diminution in the number and power of the pulse, and of the heart's action." ‡ In six cases of *acute rheumatism* recorded by Dr. Babington, one got well in three days, another in five, two in eight, one in nine, and one in sixteen days.§ The remedy, however, having proved less successful in the hands of some other persons, and some cases under his own care having failed, Dr. Rees gives the following as his more matured conclusions as to the cases in which benefit is to be expected, and those in which it will probably fail. It will probably fail in cases of *anæmial* rheumatism, chiefly seen in the form in which the swelling and redness are not strongly marked. The patient is probably anæmic, and has perhaps had much mental or bodily suffering, skin perspirable, pulse weak and rapid, pain very severe, and occasionally partaking of the neuralgic character. In such cases he has found the greatest benefit from opium. It also fails in *syphilitic rheumatism*, and in cases *simulating* rheumatism, but really connected with ordinary dyspepsia, or with Bright's disease. "With these exceptions very continued experience has but the more persuaded me of the great value of lemon juice as a remedy for rheumatism." At the same time he mentions another form which is remarkably benefited by it,—viz. rheumatism partaking more of a gouty character, affecting the smaller joints, and connected with deposits of lithate of soda, which latter sometimes disappear under its employment after having resisted all other plans of treatment.*

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* Med. Gaz. Jan. 1849, p. 156.

† Braith. Retrosp. vol. xx. p. 32.

‡ Ib. vol. xxv. p. 22.

§ Ib. vol. xxv. p. 27.

Dose.—In acute rheumatism, Dr. Rees began with ℥ss to ℥i three times a day, but he soon found that ℥j to ℥ii was a more efficient dose; and Dr. Babington usually prescribes ℥iii, and sometimes even ℥vi three times daily. As much as *half a pint!* has been taken thrice daily with benefit.† It may be taken by itself, or mixed with sugar and water; and so far from producing diarrhœa, as might be expected, these large doses frequently occasion constipation, but seldom griping.

In *scurvy*, f℥i to f℥ii twice or three times a week as a preventive, or twice or three times a day for a cure.

Of the *oil*, ♏ v to ♏ x, as a flavouring substance; fʒi to fʒii as an anthelmintic.

Officinal preparations of citric acid.— Liq. Am. Citratis, *L.* Ferri Ammon. Citras, *L. D.*

ACIDUM GALLICUM, *L. D.*

GALLIC ACID.

This acid is placed in the Materia Medica by the London College. The following directions are taken from the Dublin Pharmacopœia:

Take of Galls, in coarse powder, one pound;
Distilled water, as much as may be necessary.

Having placed the galls in a porcelain dish, pour on as much water as will convert them into a thick paste, and keep them in this moistened condition for six weeks at a temperature of between 60° and 70°, adding water from time to time, so as to supply what is lost by evaporation. Let the residue be boiled for twenty minutes, with forty-five ounces of water, and then placed on a calico filter. The filtered solution, on cooling, will afford a copious precipitate. Let this be drained on a calico filter, then subjected to strong expression, after having been first enveloped in blotting-paper, and again dissolved in ten ounces of boiling water. When, upon ceasing to apply heat, the solution has cooled down to 80°, pour it off from the crystals which have formed, and, having washed these with three ounces of ice-cold water, dry them, first on blotting-paper, and finally by a steam or water heat.

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* Braith Retrosp. vol. xxiii. p. 50. Further information on this subject and detailed cases are contained in vol. xix. xx. xxii. xxiii. xxiv. xxv. and xxvii. of the Retrosp., which contains some cases of failure, but upon the whole most satisfactory evidence in its favour.

† Braith Retrosp. vol. xxv. p. 27.

By boiling the undissolved portion of the galls with forty-five additional ounces of water, filtering into a capsule containing the liquor decanted from the crystals formed in the preceding process, evaporating down to the bulk of ten ounces, and cooling to 80°, an additional quantity of the crystallised acid will be obtained.

Explanation.—This acid is in minute colourless crystals. Though obtained from galls, it does not exist naturally in them, or at any rate is in very small proportion; but the tannic acid of which they consist absorbs oxygen during the long exposure to air whilst in a moistened state, and is converted into gallic acid, water, and carbonic acid, which latter slowly escapes.

1 eq. tannic ac. + 8 eq. oxyg. = 2 eqs. gallic ac. + 4 eqs. carb. ac. + 2 eqs. water.

Composition.—Gallic acid consists of carbon, hydrogen, and oxygen; but its composition is variously stated, according to the view taken of the manner in which some of the oxygen and hydrogen exist in the compound. They are supposed by some chemists to be combined in the form of water, and the quantity so combined is variously estimated.

The ordinary crystals consist of $C^7, O^3, H^5 + HO$, but when dried at 212° they consist of C^7, O^3, H^5, without the additional eq. of water. It is probable, however, that even then there is an atom of water, the real composition being $C^7, O^2, H^4 + HO$. *Brande.*

Characters and tests.—It is colourless, and is destroyed by fire. It is totally dissolved by water and by rectified spirit. It produces a bluish-black colour with the preparations of sesquioxide of iron when dissolved in water, but it throws down nothing from a solution of isinglass.

The freedom from colour shows that it has been carefully prepared; and the absence of any precipitate with isinglass proves the absence of tannic acid which is the most likely accidental impurity, and which does cause a precipitate with it. The other characters are sufficient for recognising it, but are not employed to indicate its purity.

Medicinal properties and uses.—Gallic acid is a pure and powerful astringent, and has been used with advantage to check the profuse sweating and diarrhœa of phthysis. It has also been employed in hæmorrhage from the bowels, lungs, stomach and kidneys, and in menorrhagia. In *albuminuria*, especially when the urine is deeply coloured, and exhibits the presence of blood, the acid is sometimes of remarkable service, which I shall illustrate by the following case under the care of Dr. Turnbull, of Liverpool; a detailed case being of far more value in illustrating the worth of a medicine than the mere naked statement that such and such a remedy has been used in such or such a disease:—"February 30. Pale and weak; skin cool; urine scanty, sometimes dark in colour and turbid. It was albuminous, and the microscope showed that it contained a very large quantity of blood globules and casts of the tubes. I prescribed for him grs. x of gallic acid three times daily. Under its use he rapidly improved; the urine became clear, it lost its red appearance, and increased in quantity. March 5.—Hardly any swelling of the legs, and the urine showed only a trace of albumen, and was almost perfectly free from blood globules. On the 8th he felt so much better that he wished to become an out-patient. I have used this remedy in several other cases of albuminuria with good effect, and I consider it a valuable one. In this case, however, it has been peculiarly efficacious, and I must not lead you to expect the same amount of good from it in ordinary cases of albuminuria." *

Dose.—Gr. iij to gr. x in pill or solution, several times daily. It does not dissolve very readily in water, requiring 100 parts of cold or 3 of boiling water. It is readily soluble in alcohol, and sparingly so in ether.

ACIDUM HYDROCHLORICUM, *L. D. E.*

HYDROCHLORIC ACID, HCl. — MURIATIC ACID. — SPIRIT OF SALT.

Synonyme. Acidum Muriaticum, *E.* Acid. Mur. venale, *D.* Chlorhydric Acid.

No directions are given in the London Pharmacopœia for the formation of this acid, which is manufactured on the large scale, as is described in the following article.

ACIDUM MURIATICUM PURUM, *D. E.*

PURE MURIATIC ACID.

Take equal weights of purified salt, sulphuric acid, and water. "Put the salt into a glass retort, and add the acid, previously diluted with a third part of the water and allowed to cool. Fit on a receiver containing the rest of the water. Distil with a gentle heat by means of a sand bath or naked gas flame, so long as any liquid passes over, preserving the receiver constantly cool by snow, or a stream of cold water." *Ph. E.*

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* Clin. Lect. reported in the Med. Times and Gaz. Vol. 26. p. 55.

Description and composition.—Hydrochloric acid, as usually seen, is an aqueous solution of hydrochloric acid gas, and when of the specific gravity of 1·16, as directed in the London Pharmacopœia, it consists of nearly 34 per cent. of acid dissolved in 66 per cent. of water.

Hydrochloric acid gas is a compound of 1 eq. of hydrogen, 1; and 1 eq. of chlorine, 36; or of one volume of each gas. When these are mixed and exposed to ordinary daylight, they slowly combine and form the acid gas; but if they are exposed to a bright sunbeam, or an electric spark is sent through the mixture, or heat is applied, they combine with a loud explosion, and the acid gas is formed as before. The gas occupies the same space after explosion as the mixture did before; and its specific gravity and eq. may be thus calculated:—

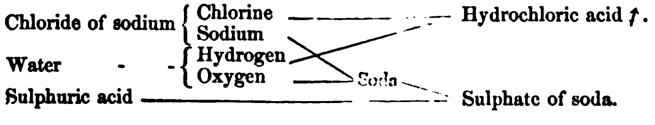
$$1\text{ eq. H, }1 + 1\text{ eq. Cl, }36 = 1\text{ eq. HCl, }37.$$

$$\begin{array}{c}1\text{ vol.}\\ \text{sp. gr.}\end{array} \boxed{\begin{array}{c}\text{H}\\ \cdot069\end{array}} + \boxed{\begin{array}{c}\text{Cl}\\ 2\cdot5\end{array}} \begin{array}{c}1\text{ vol.}\\ \text{sp. gr.}\end{array} = \begin{array}{c}2\text{ vols.}\\ \text{HCl}\end{array} \quad \boxed{\text{HCl}}\boxed{\text{HCl}}$$

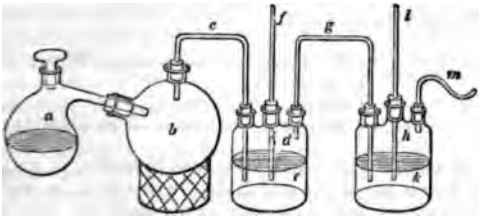
The specific gravity of which is therefore the means of the component gases, or $0\cdot069 + 2\cdot5 = 2\cdot569 \div 2 = 1\cdot284$.

Properties of hydrochloric acid gas.—It is colourless, pungent and suffocating, and capable of being liquefied by the pressure of 40 atmospheres. It is instantly absorbed by cold water, which dissolves 480 (*Davy*) times its own volume, and gives it off unchanged, on the application of heat. The condensation is accompanied by great evolution of heat. When the fumes of ammonia are brought in contact with those of this acid, they combine and form dense white fumes of hydrochlorate of ammonia.

Changes produced in the formation of hydrochloric acid.—When chloride of sodium (common salt) is heated along with aqueous sulphuric acid, the salt and some of the water are decomposed. The oxygen of the water combines with the sodium, and forms soda, which combines with the sulphuric acid, and forms sulphate of soda, which remains in the retort; and the hydrogen combines with the chlorine, forming hydrochloric acid gas, which is driven off by the heat, and is condensed by being conducted into cold water.



The gas as it flies off is usually collected and condensed by means of a Woulfe's apparatus, as here shown.



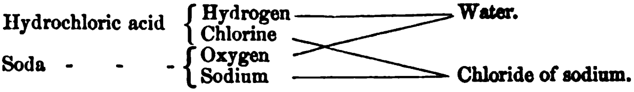
a, Retort containing chloride of sodium and sulphuric acid.
b, 1st receiver for condensing any of the materials, which may spirt out of the retort, on the application of heat.
c, pipe for conveying the gas to
d, a Woulfe's bottle, containing water, as at *e*.
g, a pipe to convey any uncondensed gas into
h, a bottle similar to *d*.
m, waste pipe for any gas still uncondensed.
f and *l*, safety pipes, in case the gas should form more quickly than can be condensed by the water, or conveyed away by *g*. In this case the gas pressing forcibly upon *e*, would drive the contents of the bottle through the tube *f*, and thus save the bottle from bursting.

Properties of liquid hydrochloric acid.—It is heavier than water, and the larger the proportion of the acid dissolved in the water, the greater is its specific gravity, which may therefore be employed as a pretty accurate measure of its strength. The most certain method of estimating it is, however, to find its saturating power, and calculate the acid from this. When pure it is colourless, but it is generally yellow from the presence of a small quantity of iron, which gives it this colour. Though this is a chemical impurity, it does not interfere with its value for medicinal purposes, but it renders it unfit for the preparation of such of the vegetable alkalies as are formed into salts with this acid. It is volatile, and the odour is peculiar and pungent. It is an active acid, and neutralises alkalies; but it is not so powerful a caustic as sulphuric or nitric acid, and seldom produces a slough when applied to the skin. It acts upon and dissolves several metals, as zinc, and combines with alkalies, and various other metallic compounds, producing a class of salts termed haloid salts. As its action upon these substances is different in many respects from that of acids containing oxygen, it may be well to exhibit the differences in this place.

If this acid acts upon a *metal*, as zinc, it is decomposed. The chlorine combines with the metal, forming a chloride of the metal, and the hydrogen escapes.

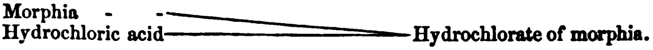
$$\begin{array}{lll}\text{Hydrochloric acid} & \left\{\begin{array}{l}\text{Hydrogen} \\ \text{Chlorine}\end{array}\right. & \xrightarrow{\qquad\qquad} \text{Hydrogen} \uparrow. \\ \text{Zinc} & \xrightarrow{\qquad\qquad\qquad\qquad} & \text{Chloride of zinc.}\end{array}$$

If the acid acts upon a metallic oxide, as oxide of zinc or of sodium (soda), no gas is evolved, though the acid is still decomposed. Its chlorine combines with the metallic base as before; but the hydrogen, instead of flying off, combines with the oxygen of the oxide and forms water.

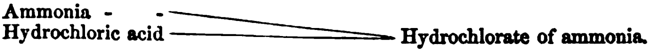


If then a metallic chloride is dissolved in water, it may be considered as a chloride of the metal, simply dissolved in water; or it may be conceived that the water is decomposed, and the metal oxidated by the oxygen, whilst the hydrogen converts the chlorine into hydrochloric acid, which combines with the oxide, forming a hydrochlorate of the metallic oxide. The former view is the one which is now universally adopted by chemists.

If hydrochloric acid is added to a *vegetable* alkali, it is supposed to combine as hydrochloric acid, for there is no oxygen to combine with the hydrogen. Thus



The same is also supposed to be the case when this acid is added to ammonia. Thus



But for some views respecting ammonia and its compounds, see AMMONIUM.

Characters and tests.—Colourless. Specific gravity 1·16 (1·17, *Ph. D.;* 1·18, com.; 1·17, pure, *E.*). It emits very pungent white fumes when exposed to the air, and is totally driven off in vapour by heat. When mixed with water, it throws down nothing on the addition of chloride of barium, or ammonia, or carbonate of ammonia. It produces no effect upon gold leaf, even when boiled in it; nor does it throw down any thing, if protochloride of tin is afterwards added. It does not remove the colour from solution of sulphate of indigo. 132 grains of crystallised carbonate of soda are neutralised by 100 grains of this acid.

Hydrochloric acid and all chlorides produce a dense *curdy white* precipitate with nitrate of silver, which is insoluble in boiling nitric acid, but is readily *dissolved by ammonia.* On exposure to light the precipitate becomes brown or black.

Hydrochloric acid is not liable to intentional adulterations. It sometimes contains a little iron, to which its yellow colour is supposed to be owing; and it often contains a little free chlorine, which is detected by its bleaching solution of indigo, or by dissolving sufficient gold leaf to produce a dark precipitate on the subsequent addition of chloride of tin. If sulphuric acid has spirted over during the process of manufacture, it will be detected by the formation of a precipitate on adding chloride of barium.

Medicinal properties. — *Tonic, refrigerant.* When given in small doses it abates febrile heat and thirst, and sometimes acts slightly upon the bowels. When applied in its concentrated form it destroys the surface of the mucous membranes, but is much less powerful than nitric or sulphuric acid, and is consequently seldom used as a caustic.

Uses.—Considerably diluted, and mixed with syrup, it is a very agreeable febrifuge in *scarletina* and *infantile remittent fever*, and indeed in most cases of febrile excitement. In *cases of phosphatic urinary deposits*, it acts very beneficially. It is not that it renders the urine acid, and so dissolves the phosphates, but it changes that diseased condition of the system which gives rise to their undue formation.

It is a common ingredient in gargles, for venereal or common ulcerated or relaxed sore throats; and in a more concentrated form it has been applied to the surface of unhealthy ulcers, and to *cancrum oris*. Bretonneau applies it in a concentrated state to the throat, to remove the membranous formation in *diphtheritis*. It produces great relief if the strong acid is *quickly* and *lightly* applied to the cheeks and gums in profuse *mercurial salivation*. The tenderness, swelling, and excessive discharge of saliva are much diminished by it. In these cases the acid should be applied by means of a small piece of sponge, and care should be taken to touch the teeth as little as possible. After a free purgative, it is very valuable in the removal of *worms*, and should be combined with a strong infusion of quassia (*Paris*). There is no application for *thrush* in children more efficacious than a lotion composed of five or six drops of this acid in an ounce of water sweetened with syrup of red poppy. If a rag is soaked in this and put into the infant's mouth, it sucks it eagerly, and the aphthæ are effectually touched with it. Care must be taken not to make it too strong, so as to cause much pain.

Antidotes.—If hydrochloric acid has been swallowed in a poisonous dose, carbonate of magnesia or of lime should be given, and soap as an emollient emetic. The carbonates of soda and potash may be given, if the others cannot be procured. The gastritis, which will probably be produced, must be treated on ordinary principles. As all acid gargles or medicines injure the teeth, it is sometimes advised to suck them through a quill. This cannot be done in the case of a gargle, and is probably an unnecessary refinement at any time.

Dose.—♏ iii to ♏ vj for internal administration. For gargles and similar purposes the proportion to each ounce of the vehicle used may be somewhat greater. The dilute hydrochloric acid is, however, generally prescribed, as the dose is more easily apportioned.

Officinal preparations. — Acidum Hydrochloricum dilutum. Calcii Chloridum. Morphiæ Hydrochloras. Zinci Chloridum. Tinctura Ferri Sesquichloridi.

ACIDUM HYDROCHLORICUM DILUTUM, *L.D.E.*

Diluted Hydrochloric Acid.

Synonyme. Acidum Muriaticum dilutum, *D. E.*

Take of Hydrochloric acid, five fluid ounces (f ℥ iv. *D.* & *E.*).
Distilled water, fifteen fluid ounces (f ℥ xiii. *D.*; f ℥ xii. *E.*).

Mix. The sp. gr. of this acid is 1·043 (1·045, *D.*; 1·05, *E.*). A fluid ounce of this acid is saturated by 168 grains of crystallised carbonate of soda.

The strength of the Dublin acid is a trifle less than that of the London and Edinburgh acids, which are alike; but the difference is so small as not to be appreciated in prescribing.

Properties and uses.—See Acid. Hydrochlor., p. 87.

Dose.—♏ xv to ♏ xxv. A larger dose than this can scarcely be swallowed.

ACIDUM HYDROCYANICUM DILUTUM, *L.D.E.*

Diluted Hydrocyanic Acid.

Synonyme. Acidum Hydrocyanicum, *E.* Prussic Acid. Cyanhydric Acid.

Take of Ferrocyanide of Potassium, two ounces.
Sulphuric acid, seven fluid drachms.
Distilled water, a pint and a half.

Mix the acid with four fluid ounces of the water; and to these, when cooled and put into a glass retort, add the Ferrocyanide first dissolved in half a pint of the water. Pour eight fluid ounces of the water into a cooled receiver; then the retort being fitted on, let six fluid ounces of acid pass into this water, distilled with a gentle heat in a sand-bath. Lastly, add six more fluid-ounces of water, or as much as may be sufficient, that 12·59 grains of nitrate of silver dissolved in distilled water may be accurately saturated by 100 grains of this acid.

D. Ferrocyanide of potas^{m}. ℥ij; Com. oil of vitriol, f℥j; Water, f℥xij.

Dissolve the salt in f℥viij of the water, and dilute the oil of vitriol with the remaining ℥iv. When both solutions are cold, mix them in a retort, and distil f℥viij by a gentle heat, and add as much water as will make up f℥xvj. Sp. gr. ·997.

E. Ferrocyanide of potas^{m}. ℥iij; Sulphuric acid, f℥ij; Water, f℥xvj.

Dissolve the salt in f℥xj of the water, and put the solution into a mattrass with a little sand. Add the acid, previously diluted with f℥v of the water, and allowed to cool. Distil with a gentle heat till f℥xiv pass over, or the residuum begins to froth up. Dilute the product with distilled water till it measures f℥xvj.

Remarks.—This acid was discovered by Scheele in 1782, and was by him named prussic acid, because he obtained it from Prussian blue. It may be obtained by distillation from several vegetable substances, as bitter almonds, the leaves of the cherry-laurel and peach tree; but it is probable that in many of these instances the acid does not previously exist in the organic mass, but is produced by a new arrangement of the elements present, under the influence of heat. (See CONFECTIO AMYGDALÆ.) In some of them it probably does exist previous to the application of heat.

Hydrocyanic acid consists of hydrogen and cyanogen, cyanogen being a compound of nitrogen and carbon. As it only exists naturally in very small quantities, it becomes necessary to form it artificially from some substance which contains nitrogen in such a state that it can easily be separated. Most animal substances contain both nitrogen and carbon in large quantities, and it is from such substances that cyanogen is obtained. Blood, horn, or hoofs are heated to redness in an *iron* pot, into which pure pearl-ash has been thrown. Under the influence of the heat the organic matter is decomposed, and the nitrogen and carbon combine to form cyanogen, which combines with potassium of the potash, forming cyanide of potassium, which then combines with some of the iron of the pot, or of the ladles, with which the mixture is stirred. The resulting ferrocyanide of potassium is then dissolved in water, and allowed slowly to crystallise, when it forms beautiful large yellow crystals, commonly known as prussiate of potash.

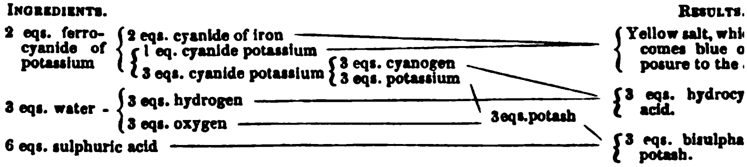
Composition of ferrocyanide of potassium.—This salt consists of 3 eqs. cyanogen $3\,\underline{N+2\,C}$; 1 eq. iron; 2 eqs. potas^{m}.; 3 eqs. water, which are generally supposed to be arranged as follows:—

1 eq. of cyanide of iron .	Cy (26)+Fe (28)=Fe Cy, eq.	54
2 eqs. of cyanide of potassium	2 Cy (52)+2 K (80)=2 KCy	132
3 eqs. of water	=3HO	27
		213

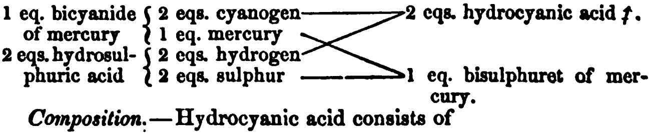
$$\text{Fe Cy}+2\ \text{KCy}+3\ \text{HO};\ \text{eq. } 213.$$

Decompositions in making hydrocyanic acid. — When ferrocyanide of potassium is heated with dilute sulphuric acid, the following changes take place, according to Mr. Everett: —

2 equivalents of the salt, 3 eqs. of water, and 6 eqs. of sulphuric acid are required. As each equivalent of the salt contains 1 eq. of cyanide of iron and 2 eqs. of cyanide of potassium, there are 2 eqs. of the former and 4 eqs. of the latter compound present. The whole of the cyanide of iron combines with 1 of these eqs. of cyanide of potassium, and forms a compound termed "Everett's yellow salt," which however speedily becomes blue. This remains in the retort. The remaining 3 eqs. of cyanide of potassium are decomposed into 3 eqs. of cyanogen and 3 eqs. of potassium, and the water also is decomposed into 3 eqs. of hydrogen and 3 eqs. of oxygen. The 3 eqs. of cyanogen and the 3 eqs. of hydrogen combine and form 3 eqs. of hydrocyanic acid, which are distilled; and the 3 eqs. of potassium and the 3 eqs. of oxygen combine and form 3 eqs. of potash. These combine with the 6 eqs. of sulphuric acid, and form bisulphate of potash, which remains in the retort.



By the above process the acid is obtained considerably diluted with water. It may be procured in a concentrated form, by passing a current of hydrosulphuric acid over bicyanide of mercury contained in a glass tube, until the whole mass has become black. The mercurial compound is decomposed, the cyanogen unites with the hydrogen of the acid, and the sulphur combines with the mercury, and forms bisulphuret of mercury.


1 eq. bicyanide of mercury
2 eqs. cyanogen
1 eq. mercury
2 eqs. hydrosulphuric acid
2 eqs. hydrogen
2 eqs. sulphur
2 eqs. hydrocyanic acid ƒ.
1 eq. bisulphuret of mercury.

Composition.—Hydrocyanic acid consists of

1 eq. cyanogen, 26; 1 eq. hydrogen, 1;=HCy or H, NC^2, eq. 27.

It consists, by volume, of

1 vol. Cy or NC^2	Sp. Gra. 1·8	+	1 vol. H	Sp. Gra. 0·069	=	2 vols. HCy	Sp. Gra. 0·93	Sp.Gra. 0·93

Strength of dilute Hydrocyanic Acid in the three Pharmacopœias.

The dilute aqueous solution of the London Pharmacopœia contains 2 per cent. of real acid, and the College makes this the standard strength to which the acid is to be reduced, in whatever way it may be prepared. What is commonly sold as Scheele's acid contains between 5 and 6 per cent., and is therefore about 3 times as strong as that of the Pharmacopœia. This is an unfortunate circumstance, as some practitioners are in the habit of prescribing Scheele's, without indicating which acid they really intend to order. As Scheele's has been so long used, and is so well known, it is much to be wished that the prescriber should always indicate which he intends, for it by no means follows that he is thinking of the pharmacopœial preparation when he simply prescribes hydrocyanic acid. The hydrocyanic acid of the Ed. Ph. is not called "diluted," and contains nearly 3·3 per cent.; it is therefore about half as strong again as the London acid; and that of the Dublin Ph. varies in strength from 1·7 per cent. to 2·5 per cent. according to variable circumstances of care and the heat employed, &c., the directions of the College being, however, followed in every instance. The Dublin College does not prescribe any standard of strength, and this want of uniformity is therefore irremediable.

In dispensing this acid, therefore, ♏x D.=♏viii ss. to ♏xii ss. Lond., and ♏x Ed.=♏xvi ss. Lond.

Characters, tests, and adulterations.—It is colourless, and goes off in vapour by heat, exhaling a peculiar odour. It affects litmus with a slight, but transitory, red colour. It is not reddened by the iodocyanide of potassium and mercury. Hydrosulphuric acid being added, it is not coloured. It throws down nothing on the addition of chloride of barium. 2 grains of hydrocyanic acid are contained in 100 grains of this diluted acid.

(Ed. fifty minims diluted with one fluid ounce of distilled water, agitated with 390 minims of solution of nitrate of silver (p. 59.) and allowed to settle, will again give a precipitate with forty minims more of the test; but a further addition of the test after agitation and rest has no effect. The precipitate entirely disappears in boiling nitric acid.)

Dilute hydrocyanic acid is not likely to be intentionally adulterated, but it is liable to spontaneous change when exposed to the light, and then becomes coloured. If good, it ought to be colourless. It is liable to contain less or more than the proper proportion (2 per cent.) of real acid, which may be ascertained by weighing the precipitate from nitrate of silver. If of the proper strength, this precipitate from 100 grains of the pharmacopœial acid ought to weigh 9·93 grs., or close upon 10 grs. The remaining tests are to prove the absence of any other acid. If sulphuric or muriatic acid is present, the red stain upon litmus would be permanent instead of transitory, and sulphuric acid would cause a precipitate with chloride of barium. Hydrocyanic acid is the only acid which does not separate the red biniodide of mercury from the iodocyanide; and therefore, if it is reddened, some other acid is proved to be present. If prepared from bicyanide of mercury, as is sometimes done, a trace of that metal is occasionally present in the acid, and will be indicated by a black colour, on the addition of hydrosulphuric acid.

The value of these tests is much lessened by the fact that many makers of hydrocyanic acid purposely add a small quantity of sulphuric or hydrochloric acid, to make it less liable to spontaneous decomposition. Almost all the tests in the pharmacopœia proceed upon the supposition that the presence of any other acid is fraudulent or injurious, which is far from being the case. In practice everything must be left to the honesty of the manufacturer of this acid, which is so cheap as to offer little or no inducement for fraudulent impurity.

If it is considered desirable to employ any test at all for the strength of this acid, that in the Ph. Ed. is much the most convenient. It will not, however, indicate exactly the quantity of acid present, neither is it intended to do so; for as the acid loses strength from frequent opening of the bottle and other accidental circumstances, the Ed. Col. allows a slight degree of latitude, and only indicates by this test that the acid is *about* the right strength. It must, however, be borne in mind that the Ed. acid ought to contain about 3·3 per cent. of real acid, whilst the Lond. acid only contains 2 per cent., and also that the Ed. solution of nitrate of silver is only one-fifth as strong as the London solution. If this test is applied to the London acid, and the London sol. arg. nitr. is used, the quantities requisite will be 48 minims for the first and 5 minims for the second addition, instead of 390 for the first and 40 for the second addition, as in the Ed. Ph.

Tests and chemical properties.—As prussic acid is sometimes taken as a poison, the tests of its presence are very important; and they are both characteristic and delicate.

The concentrated acid, as prepared from bicyanide of mercury by the method above described, is a liquid at low temperatures, but so exceedingly volatile that it boils at 79° F., and evaporates rapidly at a much lower degree of heat. It is very quickly decomposed, especially when exposed to the light, and has a peculiar and powerful odour, and a flavour resembling that of bitter almonds, and, when mixed with strong hydrochloric acid, it is converted by absorbing water into formic acid and ammonia, with the latter of which the hydrochloric acid combines (*Pelouse*). Thus

$$\left.\begin{array}{lr} \text{1 eq. hydrocyanic acid} & C^2,N,H \\ \text{3 eqs. water} \;\;.\;\;.\;\;. & H^3,O^3 \\ \hline & C^2,N,H^4,O^3 \end{array}\right\} = \left\{\begin{array}{lr} \text{1 eq. formic acid} & C^2,O^3,\;\; H \\ \text{1 eq. ammonia}\;\;. & N,H^3 \\ \hline & C^2,O^3,N,H^4 \end{array}\right.$$

The dilute acid has the same odour and flavour, but in a less degree, and is likewise decomposed by light, though not nearly so readily as is sometimes supposed. It should, however, be kept either in a coloured bottle, or better still in one covered with paper, or kept in a dark place. When added to a solution of nitrate of silver, it forms a dense *white* precipitate, which is distinguished from all the other compounds of silver by being *insoluble* in cold, but *soluble* in boiling nitric acid; and it is also soluble in a large excess of solution of potash, if some free hydrocyanic acid is present. When this precipitate has been washed and dried, it may be heated in a *small* glass tube, when it will be decomposed: the cyanogen, which escapes, may be recognised by the blue colour of its flame when ignited; and metallic silver will remain in the tube. If the quantity is very small, it may be heated on platinum foil; the colour of the flame will not be perceptible, but the silver will be reduced to the metallic state with a *slight* sudden explosion, and on being cut with a knife will show a metallic lustre. But a more delicate and characteristic test is derived from its action upon salts of iron. If a few drops of solution of potash are added to a solution of green sulphate of protoxide of iron, and any hydrocyanic acid is present, the liquid becomes blue on the addition of a few drops of hydrochloric acid, owing to the formation of Prussian blue. It is absolutely necessary to have *protoxide* of iron; as Prussian blue consists of protocyanide and sesquicyanide of iron, and the protoxide is necessary for the formation of the protocyanide.

The formation and characters of Prussian blue, and a detailed explanation of this test, are described under the head of FERRI PERCYANIDUM.

Tincture of guiacum and sulphate of copper have been proposed as a test; but they are fallacious, as they produce the same effect with spirits of nitric ether.

Liebig's test. — This is highly delicate, and easily applied. Moisten the surface of a watch-glass with a solution of hydrosulphate of ammonia, and expose it to the vapour of hydrocyanic acid. When they come together, sulphocyanide of ammonium is formed. Evaporate by a very gentle heat, until this remains dry upon the glass. Then apply a drop of a solution of any persalt of iron (persulphate or sesquichloride, or draw a glass rod dipped in either of them over the dry residuum, and a deep blood-red stain of sulphocyanide of iron is produced. To obtain the vapour of hydrocyanic acid, the materials supposed to contain it may be very gently heated (the heat of the hand is often sufficient), and the vapour received upon the moistened watch-glass, as before mentioned.

Medicinal properties. — In *small* doses, dilute hydrocyanic acid is *sedative* and *anodyne;* in *large* ones an *irritant* poison, producing its fatal effects with greater rapidity than any other with which we are acquainted. A full dose causes death in from five minutes to half an hour, which is always preceded by convulsions in the lower animals, when they are the subjects of experiment; and this is frequently the case in man, but it is not established that they always occur in the latter, as the patient is generally dead before being seen. There is no regularity as to the condition of the pupil, but the cerebral veins are generally congested. In medicinal doses it is generally thought to allay pain when dependent upon nervous irritability, and to depress the circulation. In long continued doses it sometimes causes headache and giddiness, nausea, and occasionally salivation.

Uses. — Dilute hydrocyanic acid is principally used in *gastrodynia* and *pyrosis*, or painful affections of the stomach, commencing *almost immediately* after taking food, and unaccompanied by fever. Pereira observes that its exhibition is either attended with immediate benefit, or it is of no avail. He never saw a case of moderate improvement under its use. It has been employed in many forms of *cough*, whether dependent upon inflammation, or merely of a spasmodic character, and in phthisis; but its good effects are by no means uniform in these cases. It has often been prescribed in *hooping cough*, and sometimes with benefit. It is advantageously combined with ipecacuanha or antimony. In this disease there is great tolerance of the remedy, and children will bear much larger doses than would be safe in any other affection. In *palpitations* dependent upon functional and even upon organic diseases of the heart, and especially when occasioned by indigestion, this acid frequently produces great relief. It is applied in the form of lotion, to allay the severe itching of some forms of cutaneous disease; but it is not uniformly beneficial.

It is applied locally in the form of vapour with great advantage in the treatment of *chronic opacity of the cornea*, a plan proposed by Mr. Neill. A single minim of the dilute acid combined with 9 minims of acetic ether, which promotes its volatilization and assists its action, is put into a glass of peculiar construction made for the purpose, and kept by all surgical instrument makers. This glass being held to the eye, the warmth of the hand generally suffices to cause the volatilization of the mixture, and the combined vapours should be applied to the open eye for five minutes twice a day. If more heat be required the glass may be warmed previous to the introduction of the mixture, or it may be held in a cloth wrung out of hot water. The action of the vapour produces some degree of pain and injection of the conjunctival vessels, both of which subside in a few minutes. The beneficial action of the remedy may be promoted by the subsequent application to the closed eye of a slightly astringent lotion. (Zinc. acet. or alum, gr. i in f ℥i of rose water.) It is necessary that all acute inflammation should have disappeared before the prussic acid is used, and it is frequently necessary to continue the employment of the remedy for many months. The cause of the opacity does not appear to be of much consequence as to the result, but it must be carefully borne in mind that if it is caused by the irritation excited by granular lids, no benefit can be looked for, unless this diseased state is rectified. We may indeed employ appropriate remedies for the granulations, and use the acid for the opacity at the same time; but, the latter will not disappear permanently unless the former are removed.

Dose.— ♏ iii to ♏ viii. As the acid varies much in strength, the dose at first should be small. One or two minims of Scheele's acid, or three or four of that of the Pharmacopœia, should be gradually increased until its good effects are manifest. It may be given with any light bitter infusion, and is occasionally added to an alkaline mixture.

Fatal dose, and period of death. — Smallest fatal dose for an an adult, gr. xlix. Ph. L.* Largest dose which has been followed by recovery ʒii.† Average interval between swallowing the poison and death, 2 to 10 minutes. Longest recorded interval 45 minutes.‡

Antidote. — It is seldom that antidotes can be of any avail in a poison so rapidly fatal as this is. The inhalation and swallowing of solution of ammonia, or of aqueous solution of chlorine, have been chiefly relied on hitherto. Dashing with cold water and artificial respiration should not be omitted. An antidote has been proposed by Messrs. Smith of Edinburgh, which consists of hydrated protoxide and peroxide of iron. These instantly form insoluble prussian blue, with hydrocyanic acid. They are prepared by the addition of liquor potassæ to solution of green sulphate of iron. The precipitate at first is protoxide, but in a few minutes part of it absorbs oxygen, and becomes peroxide. The precipitate is to be washed, and kept in a bottle of distilled water, which is to be free from air. It is not unlikely that it might be useful if there was time for using it.

ACIDUM MURIATICUM, *D. E.*—See ACID HYDROCHLORICUM, p. 83.

ACIDUM NITRICUM, *L. D. E.*

Synonyme. Nitric Acid. Acidum Nitrosum. Aqua fortis.

There are no directions in the present Pharmacopœia for making this acid, which is generally obtained by heating equal weights of nitrate of potash and sulphuric acid in a glass retort, and collecting the acid which distils over in a cooled receiver.

Remarks. — Nitrate of potash consists of nitric acid and potash in single equivalents, uncombined with any water of crystallisation. When exposed to a high temperature, it is decomposed and gives off part of its oxygen; but when acted upon by sulphuric acid and heat, the nitric acid, being volatile, is driven off, and the sulphuric acid combines with the potash.

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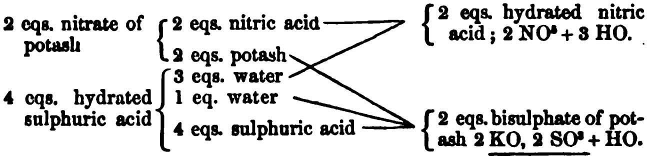
* Taylor's Med. Jur. 4th ed. p. 157. † Lancet, Jan. 1854, p. 39.

‡ Taylor, ut supra, p. 157.

The equivalent of nitrate of potash is 102; and that of sulphuric acid is 49. As equal weights are employed, there are about two equivalents of acid to one of salt; and what remains in the retort, when the process is completed, is principally bisulphate of potash. For convenience of illustration, I shall assume that exactly two equivalents of acid are used to one of salt.


2 eqs. nitrate of potash
2 eqs. nitric acid
2 eqs. potash
4 eqs. hydrated sulphuric acid
3 eqs. water
1 eq. water
4 eqs. sulphuric acid
2 eqs. hydrated nitric acid; $2\,NO^5 + 3\,HO$.
2 eqs. bisulphate of potash $2\,KO,\,2\,SO^3 + HO$.

The sulphuric acid generally employed contains 5 equivalents of water to 4 equivalents of acid (*Phillips*); and in this case another equivalent of water remains in the retort. Twice the quantity of sulphuric acid that appears necessary is employed, because the nitric acid requires 1½ equivalent of water to every equivalent of acid; and therefore, as a single equivalent of sulphuric acid would only supply one equivalent of water, an excess of this acid must be employed. On this account also, double equivalents have been taken in the diagram, that the expression of half an equivalent might be avoided. Another important reason is, that if one equivalent only were used, sulphate of potash would be formed, which is a very hard salt and not easily dissolved by water, whilst by employing two equivalents, bisulphate of potash is formed, which is much more easily dissolved, and there is therefore less risk of breaking the glass retort in removing the salt which remains after the distillation of the acid.

Properties. — Aqueous nitric acid, commonly called nitric acid, is a dense, colourless fluid, which emits disagreeable fumes, having a peculiar characteristic odour. Its taste is intensely sour, and the skin is indelibly tinged of a yellow colour by it. When exposed to the air, it attracts water, for which it has considerable affinity; and when they are suddenly mixed, heat is evolved.

Nitric acid has usually a yellowish tinge, owing to the presence of a small and unimportant quantity of nitrous acid, formed by the partial decomposition of a little of the nitric acid during its preparation. If the coloured nitric acid is moderately heated in a retort, nitrous acid is expelled, and it is rendered colourless. By exposure to the light, and especially to the direct rays of the sun, nitric acid becomes first of a straw colour, and then of a deep orange; this change is owing to the evolution of oxygen, and the consequent formation of nitrous acid. If concentrated, it does not act upon the metals in general at ordinary temperatures, nor on some of them even when boiled in it; but when a little water is added, most of them decompose a portion of the acid; and the metals, combining with the oxygen, are oxidised, and afterwards converted into nitrates by the rest of the nitric acid which remains undecomposed. During this action, nitric oxide gas is given out, which, uniting with the oxygen of the air, forms red nitrous acid gas. Nitric acid is decomposed by some combustible bodies with great rapidity, as by charcoal, phosphorus, and sugar.

For medicinal purposes the colourless acid is generally preferred; but for many chemical purposes the yellow acid, coloured by free nitrous acid, is more active. All the salts of nitric acid are soluble in water; and most of them are anhydrous.

Composition.—Though nitric acid has been obtained by M. Deville in an anhydrous state*, it cannot long be kept so. When anhydrous, or as it exists in nitrate of potash, it consists of

1 eq. of nitrogen, 14; 5 eq. of oxygen, 40 = NO^5 or N', eq. 54.

When it has a specific gravity of 1·503, it consists, according to Mr. Phillips, of

1 eq. nitric acid, 54; 1½ eq. water, 13·5 = NO^5, 1½ HO, eq. 67·5.

The acid of specific gravity 1·42, as now ordered, contains 60·37 per cent. of real acid, and consists of

1 eq. nitric acid, 54; 4 eq. water, 36 = NO^5, 4 HO, eq. 90.

The specific gravity falls in proportion to the dilution of the acid, and may be taken as a pretty accurate test of the per-centage of acid present. The only certain proof, however, is its saturating power.

Characters and tests.—It is colourless; specific gravity, 1·42; emits very acrid fumes when exposed to the air; and it is entirely dissipated in vapour by heat. When diluted with three parts by measure of water, it throws down nothing from nitrate of silver or chloride of barium. 100 grains of this acid are neutralised by 161 grains of crystallised carbonate of soda.

There is a remarkable difference between the nitric acid of the present and of the last Pharmacopœia, the present being only three-quarters of the strength of the former acid; in consequence of which, the quantities of acid directed in sundry formulæ, especially the dilute nitric acid, have been materially changed. Nitric acid is seldom adulterated, but it is liable to the presence of a small quantity of sulphuric acid from spirting in the manufacture, and of hydrochloric acid from common salt accidentally present in the saltpetre. The first is guarded against by the chloride of barium, and the latter by the nitrate of silver, which would produce precipitates were they present. The specific gravity and the saturating power indicate the strength, which ought to be about 60 per cent. of real acid. The Ed. Ph. orders two acids,—the pure, of specific gravity 1·5, containing about 80 per cent. of acid; and the commercial, of specific gravity 1·38 to 1·39, containing about 54 per cent. The Dub. Ph. simply directs commercial acid without indicating its strength; and pure acid of sp. gr. 1·5; strength, therefore, 80 per cent.

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* Gmelin's Handbook of Chemistry.

Nitric acid, when combined with potash and evaporated to dryness, yields delicate six-sided, needlelike crystals, which are neither efflorescent nor deliquescent, but which deflagrate when heated with charcoal on platinum foil, or when paper is soaked in a solution of them and then dried and set on fire. If the quantity of acid is very small, the crystals thus obtained must be put into a small test tube with a fragment of copper. On the addition of a drop or two of sulphuric acid, the salt is decomposed and nitric acid set free; and this acting upon the copper, is decomposed, and red fumes of nitrous acid appear in the tube. This is so delicate, that $\frac{1}{4}$ of a grain of nitrate of potash is sufficient for the experiment. M. Berthemot has proposed a test of singular delicacy and facility of application. A few drops of the suspected fluid are to be mixed with a drachm of sulphuric acid, and a minute portion of brucia is to be introduced into the mixture on the end of a glass rod. If nitric acid is present, delicate red streaks immediately proceed from the brucia, and the liquid ultimately becomes yellow. By this test I have detected one drop of nitric acid in six ounces of vinegar; and it is equally applicable to nitrate of potash, $\frac{1}{24}$ of a grain of which gave most decided evidence of its presence. Unfortunately, iodic and chloric acids are similarly affected by brucia and sulphuric acid, so that the test does not distinguish these from one another; but it may be usefully employed where there is no probability of the presence of the last-named acids. There are many other tests, but they do not equal the first of these in certainty, nor the last in delicacy. If the quantity of acid is considerable,—say a few drops,—a small piece of copper may be gently heated in it, when it will speedily be dissolved, forming a blue solution, and red nitrous acid fumes will be evolved.

Medicinal properties.—Nitric acid possesses in a high degree the *tonic* and *refrigerant* properties of the mineral acids generally. In a concentrated form it is violently *corrosive*, destroys all organic textures with which it comes in contact, and produces death.

Uses.—*Strong acid.* This is only used in medicine, externally; but it is sometimes taken or administered internally, as a poison. Externally, it is applied to destroy *warts* and arrest the progress of *phagedenic ulceration.* Its proper application forms a most important part of the treatment. A piece of lint, the size and exact shape of the ulcer, is to be moistened with the acid, and then laid firmly upon every part of the diseased surface. The pain at the time is frequently most acute; but the subsequent relief is very great. The entire sloughing surface is destroyed, and also a very narrow margin of skin, in which the rapidly ulcerating process was advancing. It is an elegant and excellent means of *forming a slough for an issue*, and the pain occasioned by it is not so great as that produced by the application of potash. As the *mode* of its application is very important as regards its utility or convenience, it is worth while describing it fully. A piece of lint, *half* the diameter of the intended issue, is to be cut round and laid upon a plate. Sufficient nitric acid is to be dropped upon it, to moisten the whole; and in order that there may be *no superfluous acid*, press it gently with another piece of dry lint. In this way the whole surface of the lint is wet with acid, but no drops remain to run upon the skin and cause an undesired extension of the slough. Lay the lint upon the skin, and cover it with lint spread with any simple dressing, and fasten over the whole a piece of oiled silk. In twelve hours, or less, the lint may be removed and treated like a common issue. The slough will be about twice the size of the piece of lint. Mr. Houston has advised its application for the cure of *arterial* hæmorrhage from the rectum, or from what are sometimes termed bleeding piles; or, as he describes them, "certain bright, red, prominent, smooth, vascular, strawberry-like, bleeding tumours upon the mucous membrane of a prolapsed rectum." If necessary for examination, the patient may strain until they are brought into view. He "rubs the acid well upon the diseased surface, with a piece of sponge upon a stick, and then smears the part with oil, and returns it." In all his cases the pain was not severe, the bleeding ceased, and the patient was quickly cured.* This acid has also been applied to create a slough in the vagina, for the cure of prolapsus uteri by the contraction of the cicatrix; but though this has succeeded in some cases, the general results have not been favourable.† I have seen it applied with the best results in several cases of sloughing vagina in the Dublin Lying-in Hospital, when the mucous membrane had a dark, almost black appearance, and the sloughing was extending rapidly. In these cases, the strong acid was freely applied by means of a small sponge. It is also applied as a caustic to the wounds caused by the bite of mad or venomous animals; in which cases, its fluidity is a great recommendation by enabling it to act upon the deepest parts of the wound.

When *diluted* it is used *externally* as a lotion to unhealthy, languid or sloughing sores, and as a gargle in ulcerated sore-throat. For this purpose, ♏xl or ♏l of the strong acid may be mixed with one or two pints of water. In the local treatment of *caries* of bone, there are few remedies of equal value with dilute nitric acid, which acts chemically upon the diseased bone, and dissolving the earthy portions, puts a stop to the morbid action, and leaves the still healthy portions of the bone free from the carious part. After dividing the fistulous sinuses which communicate with the diseased bone below and freely exposing it, and applying a lotion of dilute nitric acid, the improvement is frequently striking. Internally it is used as a refrigerant in *fever*. In the *phosphatic acid diathesis*. *In chronic hepatitis* it has been strongly advised by Mr. Scott, of Bombay, and it "frequently does prove very useful, even though dropsy should ultimately supervene" (*Thomson*). In *syphilis* it is not capable of superseding mercury; but it is most valuable in the broken-down constitution produced by repeated courses of mercury and dissipation. "In the *dropsy* of this condition it is very valuable when combined with digitalis" (*Thomson*). It is usually prescribed with compound decoction of sarsaparilla. In long-continued, obstinate *heartburn* it often gives far more permanent relief than alkalies. As a *disinfectant*, the strong acid is valuable because the patient need not be removed from the room. Equal parts of saltpetre and sulphuric acid should be placed in a saucer in a dish of sand kept hot. Nitric acid fumes, diffused through the air in this way, or by pouring a small quantity of the liquid acid into a saucer, have proved of great service in checking the profuse secretion of mucus, or of pus in cases of chronic bronchitis with excessive secretion, and even in cases of phthisis; and the cough has thereby been materially diminished. The remedy is easily under control, and can be removed by the patient as soon as he finds the acid is beginning to produce irritation.

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* Dub. Journ. Med. Science, Sept. 1844.

† Churchill's "Diseases of Women."

Antidotes.—The same as those for hydrochloric acid, or for acids generally.

Dose.—See ACID. NIT. DIL.

ACIDUM NITRICUM PURUM, *D. E.*

PURE NITRIC ACID.

The directions are so nearly alike in both Pharmacopœias, that I only give the Ed. formula.

"Purify nitrate of potash, if necessary, by two or more crystallisations, till nitrate of silver does not act on its solution in distilled water. Put into a glass retort equal weights of this purified nitrate and of sulphuric acid, and distil into a cool receiver with a moderate heat, from a sand-bath or naked gas flame, so long as the fused material continues to give off vapour. The pale yellow acid thus obtained may be rendered colourless, should this be thought necessary, by heating it gently in a retort." Sp. gr. 1·5, *D. E.*

Uses, &c.—Same as nitric acid above.

ACIDUM NITRICUM DILUTUM, *L. D. E.*

DILUTED NITRIC ACID.

Take of Nitric acid (commercial) three fluid ounces.
Distilled water, seventeen fluid ounces.

Dub. Nitric acid (pure), f ℥iv. ; distilled water, f ℥xxix.

Ed. Nitric acid (pure), sp. gr. 1·5, f ℥j ; water, f ℥ix. Or, Nitric acid (commercial), sp. gr. 1·39, f℥j and f ʒvss ; water, f ℥ix.

The *apparent* strength of this acid, and that ordered in the last Pharmacopœia, is very different, though they are intended to be identical. The difference is occasioned by the College having ordered the commercial acid, sp. gr. 1·42, in the present instance, and an acid specially prepared of sp. gr. 1·5, which is much stronger, in the last. The measure of acid ordered is therefore greater in the present Pharmacopœia, though the real strength of the diluted acid remains the same. The Ed. Ph. makes the diluted acid very nearly the same strength as the London one ; but the Dublin acid is about one-fifth stronger than either of them. Sp. gr. 1·082, *L.* ; 1·092 *D.* ; 1·077, *E.*

Medicinal properties and uses. — See Acid. Nitricum.

Dose. — ♏x to ♏xl. The patient's palate will seldom bear the larger dose. Lotions and gargles may contain about ♏xl to the ounce.

ACIDUM NITRO-MURIATICUM, *D.*

Synonyme. Nitro-muriatic Acid. Nitro-hydrochloric Acid. Aqua Regia

Take of Pure nitric acid, one fluid ounce.
Pure muriatic acid, two fluid ounces.

Mix. To be kept in a green glass stoppered bottle in a cool place.

Formation. — When nitric and hydrochloric acids are mixed, both are decomposed. The hydrogen of the latter combines with 1 eq. of oxygen from the nitric acid and forms water ; nitrous acid and chlorine are thus set free, and are dissolved by the water.

Properties. — It has a yellow colour, and dissolves gold (the royal metal, whence one name of the acid) and platinum. It forms a white precipitate with nitrate of silver ; and bleaches indigo. All these properties are dependent upon the free chlorine. If exposed to the light, it becomes spoiled, as the chlorine slowly decomposes the water, and re-forms hydrochloric acid.

Medicinal properties and uses. — It is *tonic* and *corrosive*, and agrees in properties generally, with nitric acid ; but it is thought to be particularly useful in congestion of the liver, or in obstruction to the secretion or excretion of the bile. It is also used even in organic diseases of the liver. It is used internally, and externally also in the form of a foot or hip bath. In either way, it causes a tingling sensation in the skin, an increased peristaltic action of the bowels, and frequently a copious flow of saliva. It is thought by some persons that it does no good unless it produces all these symptoms.

Dose and administration. — ♏x to ♏xx largely diluted. For a bath, two ounces should be added to each gallon of water in a wooden vessel, and it should be used for twenty minutes or half an hour. Dr. Scott of Bombay, who has been its chief advocate, speaks in most glowing terms of the almost instant relief which it gives during the passage of a gall stone along the duct.

ACIDUM OXALICUM.

OXALIC ACID.

Remarks. — Though this acid is not officinal, I have introduced it in consequence of the importance which it derives from its poisonous qualities, and the accidents sometimes occasioned by its similarity to sulphate of magnesia.

Preparation. — Oxalic acid is obtained by the action of nitric acid upon sugar or starch, as modifications of which, treacle or potatoes are often employed. One part of sugar or starch is digested at a moderate temperature, with five parts of nitric acid diluted with ten parts of water, until acid fumes cease to be evolved. (*Liebig, in Turner's Chemistry.*) Crystals of oxalic acid are then obtained on evaporating the solution.

Theory of formation. — Sugar and starch consist of carbon, hydrogen, and oxygen, the two latter being in the proportions to form water. Oxalic acid consists of carbon with a larger quantity of oxygen. Nitric acid readily gives oxygen to sugar or starch, and forms oxalic acid and water. Nitrous acid fumes are evolved. The essential changes which take place, are the combination of 18 eqs. of oxygen with 1 eq. of sugar, and the formation of 6 eqs. of oxalic acid, and 9 eqs. of water.

	C.	H.	O.			C.	H.	O.
1 eq. of sugar	12	9	9	=	6 eqs. of oxalic acid	12	0	18
18 eqs. of oxygen			18		9 eqs. of water		9	9
	12	9	27			12	9	27

There are, however, some other changes which may be considered accidental; some carbonic and acetic acid are also formed.

Composition. — Oxalic acid cannot exist uncombined with water or a base. As it exists in oxalate of lead, it consists of

2 eqs. of carbon, 12; 3 eqs. of oxygen, 24=$\bar{O}$, eq. 36; or $CO+CO^2$, eq. 36.

The crystals of this acid consist of

1 eq. of oxalic acid, 36; 3 eqs. of water, 27=$\bar{O}$, 3 HO, eq. 63.

Properties.—Oxalic acid is in long colourless crystals, generally having six sides and resembling sulphate of magnesia in appearance, but being about three times the size of the common small crystals of this salt. It is a powerful acid, and is soluble in water, and in alcohol. When heated, it first loses 2 eqs. of water, and is then sublimed, part of it being decomposed. When heated with sulphuric acid, it is decomposed and converted into carbonic acid and carbonic oxide gases. Its solution forms white precipitates with salts of lime, and of silver, which are insoluble in water or in a slight excess of hydrochloric acid, but are quickly dissolved by nitric acid.

Tests. — These are very important, and sufficiently characteristic. As it is often mistaken for sulphate of magnesia, it may be distinguished by the following characters.

	Oxalic Acid.	Sulphate of Magnesia.
Taste	Sour	Not sour. Bitter, nauseous.
Action upon litmus	Reddens it	Does not redden it.
Liquor potassæ	No precipitate	White precipitate.

Chloride of calcium, or lime water, causes a white precipitate, insoluble in a slight excess of hydrochloric acid, but readily dissolved by nitric acid (delicate). If this is collected, dried, and burnt on platinum foil, it yields quick lime.

Sulphate of copper causes a bluish-white precipitate (not very delicate).

Nitrate of silver causes a white precipitate, soluble in nitric acid (delicate). If this is washed, thoroughly dried, and heated in a flame, it detonates slightly. It is generally said that the whole precipitate is dissipated in white fumes. I have found that if it is heated on platinum foil, the silver is not entirely dissipated, unless the quantity is very small, but remains on the foil, as a brown, light, spongy mass.

If the oxalic acid is combined with lime, or with organic matters, boil for two hours with carbonate of potash and filter. To the filtered liquid add acetate of lead; collect and wash the precipitate; diffuse it through fresh water, and pass sulphuretted hydrogen through it for an hour; boil; let the sulphuret of lead subside; and test the clear solution for oxalic acid, as above.

It must be borne in mind that rhubarb contains oxalate of lime; and some vegetables, as oxalis acetosella and rumex acetosa contain this acid combined with potash.

Crystals for which oxalic acid may be mistaken. — Sulphate of magnesia (see above). Sulphate of zinc and bicyanide of mercury. If either of these is dissolved in water and liquor potassæ is added to the solution, a precipitate is formed, which is not the case with oxalic acid. The weight, also, of the bicyanide of mercury would distinguish it; and sulphate of zinc has not an acid taste, or action upon litmus paper.

Medicinal properties. — In *small* doses and properly diluted it is *refrigerant*; and Dr. Nardo finds that in doses of ⅛ or ¼ gr. it allays the fever and pain of inflammation of the mucous membrane of the alimentary canal, better than other remedies.* In *large* doses it acts as a powerful and rapidly fatal poison.

Symptoms of poisoning by oxalic acid. — Acute pain in the stomach; vomiting of dark coloured matters; great prostration of heart's action, and feeble pulse; loss of muscular power; legs sometimes drawn up from the extremity of the pain (*Taylor*); unconsciousness and death in a period varying from ten minutes to an hour. If death does not take place so soon, the patient has the usual symptoms of inflammation, extending from the tongue to the rectum. There is frequently numbness of the limbs, for some time after the first violence of the symptoms has disappeared.

Post-mortem appearances. — The mucous membrane of the stomach is sometimes (*Pereira*), seldom (*Taylor*), inflamed. It is generally pale, thickened, and so much softened, as to be easily scraped off with the back of the scalpel. In one case, it and the other tissues were perforated (*Christison*). The sub-mucous veins are often full of black coagulated blood, which appears almost as if charred; and the stomach often contains a dark brown gelatinous mucus. The mucous membrane is sometimes raised in longitudinal folds, like a blistered surface (*Pereira*); and in one case appeared carbonised, as if by sulphuric acid (*Taylor*).

Uses. — Except in the case mentioned above, by Dr. Nardo, oxalic acid is not used medicinally in this country. It is employed to clean boot tops, to take out ink stains, and in some processes in calico printing.

Antidotes. — Chalk and magnesia, or their carbonates. If no other supply is at hand, the plaster from a wall will answer (*Christison*). Remedies should be given as quickly as possible. Emetics are not of much use, and the stomach pump probably of still less, unless a large quantity of fluid has been swallowed and there has been little vomiting. The alkaline carbonates must be avoided, as the salts thus formed are nearly as poisonous as the acid itself.

Doses. — Dr. Nardo gives gr. ⅛ or gr. ¼, in gum water, every few hours. The smallest fatal dose on record is ℨss. (*Taylor*), but very severe symptoms have followed much smaller quantities; though death has been averted by timely treatment.

Preparations. — There are not any officinal preparations; but the binoxalate (*Taylor*) or quadroxalate (*Pereira*) of potash, commonly called salt of sorrel, or essential salt of lemons, is sometimes taken intentionally or accidentally as a poison. The symptoms and treatment are the same as those of oxalic acid.

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* Br. and For. Med. Rev. quoted in the Med. Gaz. vol. xxix. p. 126.

ACIDUM PHOSPHORICUM DILUTUM, *L.*

DILUTED PHOSPHORIC ACID.

Take of Phosphorus, six drachms.
Nitric acid, four fluid ounces.
Distilled water, eight fluid ounces.

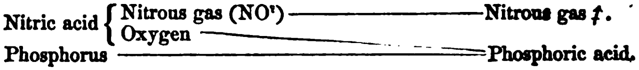
Add the phosphorus to the acid mixed with the water in a (glass) retort placed in a sand-bath; then apply heat, until six fluid ounces are distilled. Put these again into the retort that six fluid ounces may again distil, which are to be rejected. Evaporate the remaining liquor in a capsule made of platinum, until of the whole (only) two ounces remain. Lastly, add to the acid, when it has cooled, as much distilled water as may be sufficient, that it may accurately fill a pint measure, and mix.

Remarks. — Phosphorus (P; eq. 32) is a well-known elementary body, which combines readily with oxygen to form one oxide and several acids. Of the acids, the best known and most important is the phosphoric, and it is formed when phosphorus is burnt in oxygen gas, or atmospheric air. When united with bases it constitutes some of the salts of the animal fluids, and combined with lime it forms phosphate of lime, almost the whole of the harder portion of bone.

Phosphorus is obtained from the phosphate of lime in burnt bones. This is heated with sulphuric acid, which combines with part of the lime, forming insoluble sulphate of lime; and the phosphoric acid which is separated from this portion, combines with the remainder, and forms a soluble biphosphate of lime. This is poured off and evaporated to the consistence of a syrup. It is then mixed with charcoal and exposed in a retort to a high temperature, under the influence of which the carbon combines with the oxygen of the phosphoric acid, and forms carbonic acid, and the disengaged phosphorus is sublimed by the heat, and condensed, in the form of drops, in water. These are collected, and being melted at a low temperature, are poured into cylindrical moulds, forming the common sticks of this substance.

Phosphorus is solid, translucent, and nearly colourless when recently made; but it soon becomes opaque and yellow internally, and dead white externally. It is so soft that it may be indented by the nail and very easily cut. Its specific gravity is 1·9. It fuses at about 108°, and at 550° it is vaporised; it is insoluble in water or alcohol, but is dissolved by ether and by oils. It is extremely inflammable; and on this account is always kept in water. It undergoes slow combustion when exposed to the air, and hence is luminous in the dark, and it emits a disagreeable garlic-like smell.

Process.—Nitric acid consists of 1 eq. of nitrogen, and 5 eqs. of oxygen, and it very readily gives up some of its oxygen, especially when heated with certain substances which have a strong affinity for this gas, of which phosphorus is one. If strong nitric acid is added to it and heated, they burst into a violent flame. The nitric acid is rapidly decomposed, part of its oxygen combines with the phosphorus, and forms phosphoric acid, whilst 2 eqs. continue in combination with the nitrogen, and fly off as nitrous gas. When dilute nitric acid is employed, as is directed in the pharmacopœia, the same changes take place, but more moderately and slowly.



The phosphoric acid remains in the retort, dissolved by the water of the dilute nitric acid. The quantity of nitric acid employed is rather more than sufficient, in order to ensure complete oxidation of the phosphorus.

Composition. — Phosphoric acid consists of

1 eq. of phosphorus, 32 ; 5 eq. of oxygen, $8 \times 5 = 40 = PO^5$, eq. 72 ;

but the dilute acid of the pharmacopœia contains only 13·8 per cent. of anhydrous acid.

Phosphoric acid is remarkable in its relations to water and to bases. It forms three definite compounds with water.

Phosphoric acid - - - -	PO^5+3HO
Pyro-phosphoric acid - - -	PO^5+2HO
Meta-phosphoric acid - - -	PO^5+HO

The second of these is obtained by heating phosphoric acid to a temperature of 415°F.; and the third by exposing it to a red heat.

Characters and tests.—Phosphoric acid is colourless and inodorous. Sp. gr. 1·064. It throws down nothing on the addition of chloride of barium or nitrate of silver. It does not affect copper or silver leaf in any degree, nor is it coloured by hydrosulphuric acid, either before or afterwards. A fluid ounce of this acid is saturated by 132 grains of crystallised carbonate of soda, and nothing is thrown down from it.

Phosphoric, though a powerful acid, never acts as a caustic to the skin. It causes a yellow precipitate with ammonio-nitrate of silver.

It is not liable to fraudulent adulteration, and the above tests are given to guard against accidental mixture with nitric, hydrochloric, or sulphuric acid from the process of manufacture. If nitric acid were present it would act upon the copper or silver leaf, and become blackened afterwards by hydrosulphuric acid. Hydrochloric acid would precipitate nitrate of silver, and sulphuric acid chloride of barium.

Medicinal properties. — *Phosphorus* acts as a very powerful stimulant to the whole system, and is an active *aphrodisiac*. In even small doses, it sometimes causes severe pain in the stomach and death. The influence of phosphoric fumes upon persons employed in making lucifer matches is occasionally brought before our notice by the occurrence of necrosis in the jaws in such persons. It forms the subject of an elaborate and very interesting article in the Bri. & For. Med. Chir. Rev., Ap. 1848, p. 446, which well repays perusal; but the general results arrived at are the following: —

The influence of the phosphorus and of the other substances employed is not generally injurious to the health, many of the workpeople on the contrary having improved in health since commencing their occupation.

When injurious effects are produced they are most strikingly exhibited upon the bones of the upper and lower jaw; and of the two the lower jaw seems most liable to disease, though the difference is so slight as to be perhaps accidental; no other bones have been affected, and in no case has either jaw been affected unless there has been first of all one or more decayed teeth.

The disease commences like an ordinary attack of toothache, and frequently continues for some months before any special attention is paid to it. The affection spreads from the tooth to the periosteum covering the jaw, which becomes inflamed and softened, and the result is ultimate necrosis with the formation of new bone after the death of the old one, as in ordinary cases of necrosis.

The workmen chiefly affected are those employed in dipping the matches in the phosphorus, and those who separate and count them after being dried; during both these operations copious phosphoric fumes are evolved.

These bad consequences may be prevented by careful attention to ventilation and cleanliness; and it is found that washing the hands in a solution of soda is the most effectual way of removing all adherent phosphoric compounds. The dippers generally wear sponges before their mouths.

Palliative treatment and scrupulous cleanliness are evidently necessary until the progress of the disease has stopped; previous to which removal of the jaw is out of the question.

Dr. Letheby has observed an increased quantity of phosphates in the urine in a few cases, but his observations are at present the only ones which we possess. See also Guy's Hosp. Rep. Ap. 1846, p. 163; Med. Gaz. vol. iv., N. S. p. 153.

Phosphoric acid is *tonic* and *refrigerant*. It may be used in all the cases in which the mineral acids are employed, and it possesses an advantage in causing less disorder of the system, when its employment is long persisted in. It has been supposed on theoretical grounds, that it might be useful in cases of a deficiency of this acid in some of the structures of the body, as in rickets and deposit of phosphates in the urine; but experience does not confirm these hypothetical anticipations.

Uses. — Phosphorus is so seldom used in this country, that nothing need be said about it. Phosphoric acid is said by Dr. Paris to allay the thirst of diabetes more effectually than any mineral acid with which he is acquainted.

Dose.—♏x to ♏xxx. The palate can scarcely bear the larger dose.

ACIDUM PRUSSICUM, *D.* PRUSSIC ACID.

See ACID. HYDROCYAN. DILUT. p. 88.

ACIDUM SULPHURICUM, *L.D.E.*

Synonyme. Sulphuric Acid. Oil of Vitriol.

Remarks. — This is an article of the Materia Medica, being manufactured only on the large scale. No directions, therefore, are given for its preparation in any of the Pharmacopœias.

Characters and tests. — Sulphuric acid is free from colour and smell. Sp. gr. 1·843 (1·84, or near it; the *pure* acid has a sp. gr. of 1·846, *D.*, 1 845, *E.*). When mixed with an equal measure of water it generally throws down a white though slight precipitate (only a scanty muddiness, *E.*), and it gives off no (orange, *E.*) fumes of nitrous acid. Diluted with twelve parts of water it throws down nothing yellow on the transmission of hydrosulphuric acid (but causes a white muddiness, *E.*) 100 grains of this acid are saturated by 285 grains of crystals of carbonate of soda. (If pure, dilution with water causes no muddiness, and solution of sulphate of iron shows no reddening at the line of contact, *E.*)

If the specific gravity of the commercial acid exceeds 1·84 or 1·843, it shows fraudulent or careless admixture with some foreign body; if it falls below it, the acid is too weak. There is generally a *small* quantity of sulphate of lead, derived from the chambers in which the acid is made, but it ought not to cause more than a slight muddiness on being mixed with water. A *small* quantity of nitrous acid or binoxide of nitrogen is also generally present, from the process of manufacture. If it is in sufficient quantity to cause an escape of orange fumes of nitrous acid when mixed with an equal measure of water, there is too much, owing to carelessness. A green solution of sulphate of iron is almost always reddened at the line of contact when poured upon the commercial acid, owing to the peroxidation of the iron by even that small quantity of nitrous acid, and therefore this test is only to be applied to the pure acid. If arsenic is present, derived from the iron pyrites employed in the manufacture, it is shown by a yellow colour and precipitate from hydro-sulphuric acid. Owing to a temporary deficiency in the supply of sulphur from Sicily a few years since, it was obtained from iron pyrites (sulphuret of iron), which generally contains some arsenic, and the sulphuric acid manufactured from it contained a large quantity of arsenious acid,—as much as from 35 to 95 grains in a pint. It is now generally free from this impurity, and I had some difficulty lately in obtaining any which contained arsenic. Sulphate of potash is sometimes added to increase its specific gravity, and therefore its apparent strength. It may be detected by neutralising the acid with carbonate of ammonia, evaporating the solution to dryness, and then expelling all the sulphate of ammonia by a gentle red heat. The sulphate of potash will remain in the crucible. Sulphuric acid is distinguished from all other bodies by forming a white precipitate with nitrate of barytes, which is insoluble in boiling dilute nitric acid. This precipitate, when washed and dried, mixed with charcoal, and heated to redness for some time in an iron spoon or crucible, is converted into sulphuret of barium. When it is then laid upon moistened silver it produces a black stain from the action of the sulphur upon the metal.

Description and varieties of sulphuric acid.—*Liquid* sulphuric acid, sometimes called *Oil of vitriol*, from its oily appearance and from having been formerly obtained by distilling sulphate of iron (green vitriol), is the kind generally used in this country, and invariably employed for medicinal purposes. When its sp. gr. is 1·84, or 1·843, it consists of—

4 eqs. of sulphuric acid, and 5 eqs. of water; eq. 51 (*Phillips*).

And contains therefore about 77 per cent. of real acid. *Anhydrous* sulphuric acid is a solid crystalline substance, and is obtained by distilling crystallised sulphate of iron. At first a *fuming* acid called Nordhausen acid, from the place of its manufacture, is distilled, which contains a little water derived from the water of crystallisation; on re-distilling this, the dry anhydrous sulphuric acid is obtained in a crystallised form, and consists of—

1 eq. sulphur, 16; 3 eqs. oxygen, $8\times3=24$; SO^3, eq. 40.

This anhydrous acid scarcely possesses acid properties; for the development of which it appears as if the presence of water was necessary. Ordinary sulphuric acid acts very slowly upon metals at common temperatures; but at a boiling heat it is decomposed by several of them, which it oxidises with the escape of sulphurous acid. It has a very strong affinity for water, which it attracts rapidly from the air, or from any substance containing it. When mixed with water, the volume of the mixture is less than that of the ingredients separately, and much heat is evolved. If one part of water at 50° is suddenly mixed with four parts by weight of sulphuric acid at 50°, condensation takes place, and the temperature rises to 300°. Sulphuric acid is a violent caustic, and decomposes all animal and vegetable substances with which it comes in contact, abstracting the water, and causing a black or brown appearance from the carbon which is thus set free. When it touches the skin, it has a soapy feeling, in consequence of its dissolving the cuticle. Dilute sulphuric acid readily combines with such metals as are capable of decomposing water, *e.g.* iron and zinc. The oxidized metal combines with the acid, whilst the hydrogen of the decomposed water is set free and escapes as gas.

Theory of the process of the formation of sulphuric acid.—A mixture consisting of eight parts by weight of sulphur, and one of nitrate of potash or soda, is burnt in a furnace having a leaden chimney, communicating with a chamber lined with lead, which is open at the top to furnish a supply of atmospheric air, and the bottom of which is covered with water, to a depth of three or four inches. The nitric acid of the nitrate of potash is decomposed, and the binoxide of nitrogen, or nitrous gas, which is set free, passes along the chimney into the leaden chamber. The greater part of the sulphur is converted into sulphurous acid by its combustion in the oxygen of the air supplying the furnace, and this also passes along the chimney into the chamber. There are therefore, in this chamber, sulphurous acid vapours, binoxide of nitrogen, and water.

In the improved method now adopted in some places, the sulphur is first burnt by itself in a furnace, and the sulphurous acid fumes conveyed into the leaden chamber. Nitrate of potash is decomposed by means of sulphuric acid, and the nitrous acid thus formed is also conveyed into the same chamber. Lastly, steam is also carried thither by a separate pipe. There are present, therefore, sulphurous acid, nitrous acid, and watery vapour.

The changes which now occur are very complicated, and there is some difference of opinion as to their exact nature, though all are agreed as to the general principle. The arguments adduced by Turner* seem conclusive as to the accuracy of the following explanation. When suphurous acid, nitrous acid, and water are present together, a white crystalline compound, *a*, is formed, which consists of sulphuric acid, SO^3, hyponitrous acid, NO^3, and moisture. The nitrous acid has here given up one equivalent of its oxygen to the sulphurous acid, which has been thereby converted into sulphuric acid. As soon as this crystalline compound falls to the bottom of the chamber, and comes in contact with the water, it is decomposed. The sulphuric acid, SO^3, is dissolved by the water, and the hyponitrous acid, NO^3, rises; but as it cannot exist in the free state, it is instantly converted into nitrous acid and binoxide of nitrogen, or nitrous gas ($2\,NO^3 = NO^4 + NO^2$). The binoxide of nitrogen rises to the top of the chamber, and combining with two equivalents of oxygen from the atmospheric air, is reconverted into nitrous acid. This combines with a fresh portion of sulphurous acid, a constant supply of which is kept up from the furnace in which the sulphur is burning; the crystalline compound is formed, and again decomposed, and the binoxide of nitrogen again liberated. This gas acts therefore as a carrier of oxygen from the air, to convert the sulphurous into sulphuric acid.

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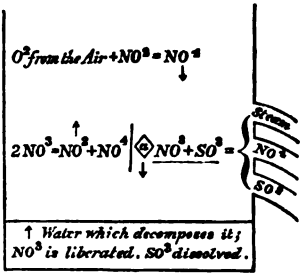
* Turner's Chem. 5th edit. p. 308.


O^2 from the Air $+ NO^2 = NO^4$
$2NO^3 = NO^2 + NO^4$
ⓐ $NO^3 + SO^3 =$
Steam
NO^4
SO^2
↑ Water which decomposes it; NO^3 is liberated. SO^3 dissolved.

When the water has dissolved a sufficient quantity of the acid, it is drawn off, and evaporated to a proper degree of concentration in retorts made of glass, lead, or platinum. The concentrated acid acts but very slightly upon lead, which can therefore be used for this purpose.

Incompatibles.—The only incompatible medicine with which sulphuric acid is likely to be prescribed is acetate of lead, for the purpose of arresting hæmorrhages. If given at all along with it, they ought to be in totally separate compounds, *e. g.* the lead in pills, and the acid in a mixture, and a period of half an hour or more should intervene between swallowing the one and the other. It is often prescribed along with sulphate of magnesia.

Medicinal properties.— *Corrosive*; *tonic*; *refrigerant*; *astringent.* When taken in its concentrated form, sulphuric acid is a violent corrosive poison, destroying every thing with which it comes in contact—the mouth, throat, and stomach, &c. When taken in small doses, it acts like the mineral acids generally, in abating thirst and heat of skin, in reducing the frequency of the pulse, checking profuse sweating, and in improving the appetite, and it exerts a beneficial influence in suppressing internal hæmorrhages. If long continued, it sometimes causes griping, and it occasionally acts as a diuretic when others have failed.

Uses.—In its *concentrated* form it has been used as a caustic in *entropion* and *ectropion*, in order to destroy the skin or conjunctiva, that the disease may be cured by the contraction of the subsequent cicatrix.

In a diluted form, it is exceedingly efficacious in checking *colliquative sweating*, either in phthisis, or in other diseases. In *fever*, mixed with barley water and sweetened according to the patient's taste, it is refreshing and agreeable. In *internal hæmorrhages* and *purpura hæmorrhagica* it is generally used; but its effects when given alone are not very obvious. In the *latter stage* of *fever*, it is often given, combined with bark or disulphate of quinine, of which alkaloid it is the usual solvent. Mr. Benson speaks highly of its efficacy as a prophylactic medicine, for *preventing lead colic.* In some extensive works in which this disease had previously been not uncommon, it was entirely prevented by the frequent use of small quantities of this acid in treacle beer.* In *phosphatic states* of the *urine*, and in *pyrosis*, it is preferable to hydrochloric acid, as its continued use does not so soon disorder the stomach. When taken internally, in *chronic skin diseases*, as *lichen*, *prurigo*, and especially *nettle rash*, it is superior to most remedies in allaying the troublesome itching. The late Dr. Babington used to prescribe a drop of the strong acid in combination with a few grains of aloes in lead colic. The remedy should be frequently repeated, and often acts very beneficially. Dr. Thomson has found the diluted acid, when given to the extent of f℥j daily, successful in curing obstinate scabies.†

In *diarrhœa accompanied* by *vomiting* and *cramps*, dilute sulphuric acid has lately been recommended by Mr. Griffiths, and has been used with remarkable benefit, according to the testimony of several witnesses. "Countenance anxious; doubled up with pain in the belly, and legs drawn into knots by cramp; features pinched and drawn; extremities icy cold; tongue very dirty, dry in centre; pulse rapid, small and weak; vomiting, and pale watery purging for four hours. [℞ Acid. S. Dil. ♏xx every hour.

"Vomited the first draught, not the second; no further purging, and in two hours quite warm and free from pain; medicine reduced in frequency; gradual steady improvement."

"Vomiting, purging, and cramps for 36 hours, gradually increasing; on admission, features collapsed; feet icy cold. Incessant shivering for six hours; vomiting and purging incessant; dejections pale and watery; vomited matters acid and colourless; violent cramps in legs.

℞ Acid. S. Dil. ♏xv every hour.

"In two hours warm and almost free from pain; vomited the first dose, a second was immediately given, and after it there was no vomiting, purging, or cramp."

"I have administered it to 27 patients in St. George's Hospital, all of whom, except three, derived immediate and striking benefit, the sickness speedily abated, the purging ceased, and the pain in the abdomen shortly subsided. I have given doses of ♏v. to a child of 16 months old with perfect success, and I have known it given with the happiest results to children of a still more tender age.

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* Lancet, 1841-2, vol. i. p. 435.

† Dispensatory.

"What class of cases are most benefited by it? Its effects have appeared to me remarkable in proportion to the suddenness and severity of the attack. Attacks sudden without previous derangement of stomach, accompanied by depression and severe cramp, are certainly checked more rapidly by the acid than by any other treatment, however active; but an attack of ordinary bilious vomiting and purging, *preceded by derangement of the primæ viæ*, is better treated by calomel, opium, rhubarb, &c., on the old plan." —Dr. Fuller.*

"In my first experience of it it never failed to relieve immediately, but was not so magical in staying the disease at once; but I soon perceived that I had not administered it in sufficient doses. I had given ♏xx to ♏xxx at repeated intervals, but I now give larger doses. I have never yet found it fail, nor known any bad consequences from it." — Mr. Buxton.†

"In the hands of many this remedy has failed to realise its reported advantages over other methods of treatment. Why? It has been used in wrong cases. Simple bilious diarrhœa, with copious and feculent stools, slight nausea and griping, is not much benefited by it. But if a patient previously well, and not having committed any error of diet, is seized with profuse diarrhœa, at first fluid and ultimately resembling dirty water, with little if any solid matter, with vomiting of large quantities of fluid, severe cramps and colic, pulse small and frequent, skin cold and clammy, and countenance anxious, in such cases I have found the sulphuric acid a most valuable remedy, frequently in a few hours restoring the patient from a condition of extreme distress to one of comparative comfort. I usually gave ♏xxx every one, two, or three hours." — Mr. North.‡

As a *local stimulant*, sulphuric acid, mixed with from four to eight times its weight of lard, is a useful counter-irritant in *chronic swelling*, remaining after synovial inflammation *of the joints;* and is a useful application to *scabies*. The late Mr. Wildsmith was in the habit of adding ♏xx or ♏xxx of the strong acid to an ounce of the tartar-emetic ointment, and found it produced a more uniform and manageable eruption, than the ointment alone.

Dose.—Of the dilute acid, ♏x to ♏xxx. It may sometimes be given to the extent of f℥i in the day.

Antidotes.—Chalk and magnesia, or their carbonates, and the carbonated alkalies, and soap. Magnesia and the carbonated alkalies are not so good as chalk, inasmuch as they form purgative, and thereby depressing and irritating compounds. If necessary, the plaster from a wall may be broken down, so as to supply carbonate of lime.

Officinal preparations.—All the sulphates, and there used to be an ointment in the Ph. D. for the purpose above described.

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* Braithwaite's Retros. vol. xxv. p. 141, *et subs.*

† Ditto, p. 144.

‡ Ditto, vol. xxvii. p. 94.

ACIDUM SULPHURICUM PURUM, *D. E.*

PURE SULPHURIC ACID.

The commercial acid is liable to contain a very small quantity of nitrous acid and sulphate of lead, from the process of manufacture; and sometimes it is fraudulently adulterated with sulphate of potash, to increase its specific gravity, and so its apparent strength. It also sometimes contains arsenious acid. To get rid of all these the Edinburgh Pharmacopœia gives the following directions: —

"If commercial sulphuric acid contain nitrous acid, heat eight fluid ounces of it with between ten and fifteen grains of sugar, at a temperature not quite sufficient to boil the acid, till the dark colour at first produced shall have nearly or altogether disappeared. This process removes nitrous acid. Other impurities may be removed by distillation; which on the small scale is easily managed, by boiling the acid with a few platinum chips in a glass retort, by means of a sand-bath or gas flame, rejecting the first half ounce (and discontinuing the process when only an ounce remains in the retort, *D.*)"

When arsenious acid is found to be present, it is better to reject the sample at once than trust to fitting it for medicinal purposes by distillation.

ACIDUM SULPHURICUM AROMATICUM, *D. E.*

AROMATIC SULPHURIC ACID.

Synonyme. Elixir of Vitriol. Acid Elixir of Vitriol.

Take of Rectified spirit, one pint and a half.
Sulphuric acid (pure, *D.*; com. *E.*), three fluid ounces and a half.
Ginger, bruised, one ounce.
Cinnamon, bruised, an ounce and a half.

Dub. — Upon the spirit, placed in a stoppered bottle, pour the acid gradually, and shake so as to produce a uniform mixture. Then add the cinnamon and ginger, and macerate for a week with occasinal agitation. Lastly, filter through paper, and preserve in a well stoppered bottle. *E.* — Mix the powders, moisten them with a little of the acid spirit, let the mass rest for twelve hours and then put it into a percolator, and transmit the rest of the acid spirit.

Uses. — The same as those of dilute sulphuric acid.

Dose. — ♏x to ♏xx. Sp. gr. ·974, *D.*

ACIDUM SULPHURICUM DILUTUM, *L. D. E.*

DILUTE SULPHURIC ACID.

Take of Sulphuric acid, fifteen fluid drachms.
Distilled water, a pint.

Add the acid by degrees to half a pint of the water; then pour on as much of the remaining water as will make the mixture accurately fill a pint measure, and mix.

D. & *E.* Sulph. acid f℥i, water f℥xiii.

Remarks. — When the acid and water are mixed as above directed, considerable heat is produced, and the mixture becomes slightly muddy, owing to the separation of a small quantity of sulphate of lead, which, though soluble in strong, is not soluble in dilute, sulphuric acid.

Character and tests. — Sp. gr. 1·103 (1·09, *E.*; 1·084, *D.*). A fluid ounce of this acid is saturated by 216 grains of crystals of carbonate of soda.

The strength of the dilute acid is not the same in all the Pharmacopœias, being nearly 1 part in 10 in that of the London, and 1 part in 14 in those of Dublin and Edinburgh. This must be borne in mind in prescribing and dispensing.

Medicinal properties and uses. — See ACIDUM SULPHURICUM.

Dose. — ♏x to ♏xxx. It has been given to the extent of f℥i in the day.

Officinal preparations. — The most important is Infus. Rosæ co.

Table of the Strength of the Dilute Mineral Acids.

Acidum hydrochloricum dilutum	-	-	♏j in ♏iv.
„ nitricum „	-	about	♏j in ♏vii.
„ sulphuricum „	-	nearly	♏j in ♏x.

ACIDUM SULPHUROSUM. (Not Off.)

SULPHUROUS ACID.

This acid is not officinal, and the following plan is the one adopted in the Birkbeck Laboratory by Dr. Williamson, who prepared the acid used by Dr. Jenner, as described below: —

Take of Coarsely powdered charcoal any convenient quantity.
Sulphuric acid any convenient quantity, so as to occupy about half the retort, which must be made of glass.

Apply heat, that the sulphurous acid may be evolved, which must be passed into cold water in a Woolfe's apparatus until it is saturated.

Copper slips may be substituted for charcoal in the above process; but when the quantity of acid required is large the charcoal is cheaper, and is equally convenient.

Explanation.—When sulphuric acid, SO^3, is boiled with copper, or charcoal, it is decomposed, and loses one equivalent of oxygen, which combines with these bodies, and SO^2 (sulphurous acid) is set free in a gaseous state. This gas being passed into the water in the Woolfe's apparatus, is dissolved; but if charcoal is used a larger number of absorbing bottles is required, than if copper is employed (Williamson).

Properties.— Sulphurous acid is a pungent acid gas, having the odour of burnt sulphur. It is readily dissolved by water. By cold, or by the pressure of two atmospheres, it is condensed into a liquid which boils at a low temperature, and produces great cold by its evaporation.

Medicinal properties and uses.— "*Parasiticide.*"—Although sulphurous acid has not hitherto been introduced into the pharmacopœia, it has long been in use under the name of sulphur baths or fumigations, the acid being applied in the form of vapour obtained by the combustion of sulphur. It has latterly been brought into notice, in the form of solution, for the treatment of Tinea; and though not yet generally adopted, its employment deserves notice. The employment of this acid was suggested by Prof. Graham as a remedy for cholera, at the time when this disease was supposed to be owing to the presence of some lowly organized living bodies within the intestinal canal; and although this notion was proved to have been a mistaken one, the same principle was acted upon by Prof. Jenner; who suggested its employment in those diseases of the scalp known popularly as ringworm, which derive their existence from the presence and growth of the spores of vegetable bodies of very low organisation (Achorion Schönleinii, &c.) about the root of the hair. It has been found to check the progress of fermentation, by destroying the vitality of the Torulæ cerevisiæ, or yeast, and the results of the adoption of this acid in the treatment of Tinea are given by Prof. Jenner in a lecture in the Med. Times, and Gaz., Aug. 1853, p. 181, quoted in Braith. Retr., vol. xxviii. p. 293.

Sulphurous acid is not only employed in the form of vapour and watery solution, but also in that of sulphite or hyposulphite of soda. This being a salt easily decomposed, is decomposed in the stomach, and the sulphurous acid is set at liberty by the acids of the stomach combining with the soda. The disease in which this remedy is used is also attributed to the growth of a low form of cellular plant, the sarcina (an alga or fungus), in the contents of the stomach; and to this also the sulphurous acid proves fatal. When present and vegetating, this body sometimes gives rise to obstinate vomiting, the vomited matters exhibiting the sarcina in various stages of growth, when examined under the microscope. In has also been used with advantage as sulphite of soda in some cases of *thrush*, the acid secretions of the mouth setting the sulphurous acid free.

Case.—A Jew.—Head covered with Tinea favosa for nine years. Treatment previously ineffectual. Crusts thick and irregular; odour offensive; much itching; numerous similar crusts on the trunk and limbs. No treatment for three weeks after admission; state unchanged. Rags wetted with a solution of sulphurous acid were then applied to the scalp, and covered with oiled silk In five days crusts freely separating and no itching. In four days more "a mere trace of the favous crusts on the scalp, but the skin red and looking tender." As this might be owing to the acid, zinc ointment was substituted. The reports after this continued to be favourable, and in six weeks the patient was discharged. "Scalp resuming its natural pale colour; hair growing; only too small pustules on the head, and no trace of a parasite discoverable by the microscope. Skin generally appeared healthy."

For the disease on the body a tepid bath had been used twice, for half an hour each time, containing sixteen ounces of saturated solution of sulphurous acid.

Bath of sulphurous acid (*Jenner*).

Take of Saturated solution of sulphurous acid f℥xvj.
Tepid water a bath full.—Mix.

Lotion of sulphurous acid (*Jenner*).

Take of Saturated solution of sulphurous acid f℥ij.
Water f℥vj.—Mix.

ACIDUM TANNICUM, *L. D.*

TANNIC ACID.

Take of Galls, in tolerably fine powder, eight ounces.
Sulphuric ether, three pints.
Distilled water, five ounces.

Incorporate the water and ether by agitation, and pour the resulting solution in successive portions upon the galls, previously introduced into a glass or porcelain percolator. The liquid which accumulates in the lower bottle will consist of two distinct strata; the heavier of which is to be separated and evaporated to dryness: finally applying an oven heat, which, however, should not exceed 212°.

From the lighter liquid the ether may be recovered by distilling it by means of a water bath, and with the aid of a Liebig's condenser.

Remarks.—The above directions are taken from the Dublin Ph., the London College not having given any for the preparation of this acid. The object in this case is to expose the galls to the air as short a time as possible, and therefore a percolator is employed, and the process is finished in a few hours, by which the absorption of oxygen is prevented, which would otherwise convert the tannic into gallic acid. (See Acid. Gallicum, p. 81.)

Composition.—Tannic acid consists of C^{18}, H^{8}, O^{12}, and these elements are considered by Berzelius to be arranged in this manner He, therefore, considers the acid to be *an*hydrous, or without water. Löwig, on the contrary, considers 1 eq. of O and 1 eq. of H to be combined so as to form 1 eq. of water, and he regards the acid as *mono*hydrated (with 1 eq. of water), C^{18}, H^{7}, $O^{11} + H\ O$ or *monobasic.* Liebig, again, thinks that 3 eq. of H and 3 eq. of O are combined in the form of water, and he, therefore, calls it a *tri*basic acid, C^{18}, H^{5}, O^{9}, $+ 3\ H\ O$—Brande. That all these agree essentially may be seen at a glance.

		C.	H.	O.			C.	H.	O.
Berzelius—Tannic acid	Anhydrous	18	8	12		=	18	8	12
Löwig „	Monohydrous	18	7	11	+ HO	=	18	8	12
Liebig „	Terhydrous	18	5	9	+3HO	=	18	8	12

Characters and tests.—Almost free from colour; when dissolved in water it is powerfully astringent; it throws down a white precipitate from solution of isinglass. In other respects it corresponds with gallic acid.

Tannic acid is not likely to be accidentally adulterated, and the College has not thought it necessary to guard against fraudulent impurity. The above tests merely distinguish it from gallic acid, which does not produce a precipitate with isinglass, whilst tannic acid does. Tannic acid is very soluble in water, but less so in alcohol and ether. When passing through the digestive and circulating systems, it is gradually converted into gallic acid.

Medicinal properties and uses.—Tannic acid is a powerful *astringent,* and has been given with benefit in *menorrhagia* and to check the profuse *sweating and diarrhœa* of phthysis. It is also given in discharges of blood similar to those in which gallic acid is employed. There is, however, this difference between the two remedies. Tannic acid acts chemically upon the gelatine of the tissues, and is a more powerful astringent when applied locally, or before it passes into the circulation. It is, therefore, more useful than gallic acid as a gargle in relaxed uvula, in diarrhœa, or as an injection to check hæmorrhages. But, as it undergoes conversion into gallic acid in the system, this latter acid is supposed to be more useful when remote organs are to be affected; and, therefore, in hœmaturia, or bloody urine, gallic acid is supposed to be a more valuable remedy than tannic acid. These views, it must be acknowledged, are still somewhat hypothetical; but they are so far borne out in practice as to deserve recollection when deciding which remedy to adopt in any particular case.

Dose.—Gr. ii to gr. x in pills. This is a better form than that of solution, as the acid quickly undergoes changes. For injections gr. iv to gr. x in f℥j.

ACIDUM TARTARICUM, *L.D.E.*

TARTARIC ACID.

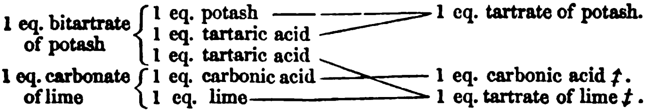
Take of Bitartrate of potash, four pounds.
Boiling distilled water, two gallons and a half.
Prepared chalk, twenty-five ounces and six drachms.
Diluted sulphuric acid, ten pints and seven fluid ounces.
Muriatic acid, twenty-six fluid ounces and a half, or a sufficiency.

Boil the bitartrate with two gallons of the distilled water, and add gradually half the chalk, constantly stirring. When the effervescence is over, add a solution obtained by dissolving the rest of the chalk in the muriatic acid diluted with four pints of the water. After the tartrate of lime has subsided, pour off the liquid, and wash the tartrate with distilled water till it is tasteless. Then pour the diluted sulphuric acid on the tartrate and boil for fifteen minutes. Evaporate with a gentle heat to obtain crystals. Purify these by repeated solution, filtration, and crystallisation.

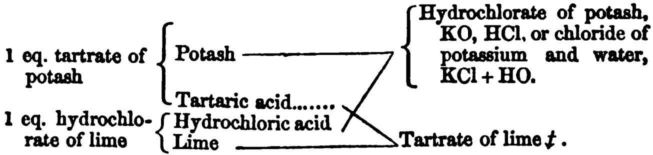
The London College does not give any directions in the present Pharmacopœia for obtaining this acid, and the above directions are taken from the Ph. Ed. They are identical with those given in the Ph. Lond. of 1836.

Remarks.— For a description of bitartrate of potash, see this salt among the metallic preparations.

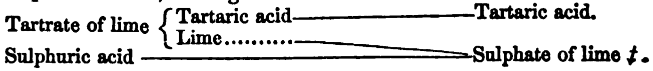
Process for making tartaric acid.— Bitartrate of potash consists of 1 equivalent of potash, and 2 equivalents of tartaric acid. When it is boiled with chalk both are decomposed; the second equivalent of the acid combines with the lime and forms tartrate of lime, which is insoluble, and the carbonic acid of the chalk flies off. One equivalent of the tartaric acid remains combined with the potash, and forms tartrate of potash, which remains dissolved.



In order to separate the remaining tartaric acid from the potash, it is necessary to employ some soluble salt of lime, and for this purpose it is directed that some of the chalk shall be dissolved in muriatic (hydrochloric) acid. The solution which is obtained consists of chloride of calcium in water, or, as before explained (see ACID. HYDROCHLOR. p. 86), it may be considered as muriate (hydrochlorate) of lime. When this solution is added to the solution of the remaining tartrate of potash, double decomposition ensues,—the tartaric acid combines with the lime and forms tartrate of lime, which is insoluble, and the hydrochloric acid unites with the potash to form hydrochlorate of potash (or chloride of potassium in water), which remains in solution.


1 eq. tartrate of potash
Potash
Tartaric acid.......
1 eq. hydrochlorate of lime
Hydrochloric acid
Lime
Hydrochlorate of potash, KO, HCl, or chloride of potassium and water, KCl + HO.
Tartrate of lime ‡.

Both equivalents of tartaric acid are thus obtained in combination with lime; and this, whilst still moist, is to be boiled with dilute sulphuric acid, which has a stronger affinity than tartaric acid for the lime, and accordingly combines with it and forms sulphate of lime, leaving the tartaric acid in solution.



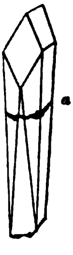
Composition.—Tartaric acid consists of

4 eqs. carbon, 24; 2 eqs. hydrogen, 2; 5 eqs. oxygen, 40 = $\overline{T}$, or $C^4H^2O^5$; eq. 66.

In crystals, with 1 eq. water of crystallisation,

$$\overline{T} + HO;\ \text{or}\ C^4H^2O^5 + HO;\ \text{eq.}\ 66 + 9 = 75.$$

Properties.—Tartaric acid is capable of being crystallised, and the primary form of the crystals is an *oblique rhombic prism;* but their general figure is that represented in the sketch, which was drawn from a common crystal made by Messrs. Howard. They are frequently much shorter than this, being about the length shown at *a.*



The crystals of tartaric acid are only semi-transparent. They are soluble in about four times their weight of cold, or twice their weight of boiling water. They are almost insoluble in alcohol. They are neither deliquescent nor efflorescent, but in a damp air they attract a little moisture.

Crystals for which tartaric acid may be mistaken.—*Citric acid* is the only acid crystalline substance for which it could be mistaken. Tartaric acid is distinguished by the greater size, and especially length, of its crystals, by their slight transparency, and by their attracting less moisture from the air than the citric. Chemically, they are distinguished by their action upon the salts of potash. Citric acid does not produce a precipitate with any salt of potash except the tartrate. When added to this, citrate and the slightly soluble bitartrate of potash are formed; but tartaric acid forms a precipitate of bitartrate with every salt of potash, and if added in excess, even with solution of potash itself.

Characters and tests.—Colourless. It is totally or almost entirely destroyed by fire. It is soluble in water. This solution throws down bitartrate of potash from any neutral salt of potash. From the same solution nothing is thrown down by chloride of barium; and what is precipitated by acetate of lead is dissolved by nitric acid. 100 grains of this acid are saturated by 192 grains of crystals of carbonate of soda.

Its entire dissipation by fire proves the absence of any earthy salt; which, however, is not at all likely to be present. As the last portions of carbon from organic bodies are not easily burnt away, the Ed. Coll. desires a small quantity of red oxide of mercury to be mixed with the acid previous to applying the heat. The formation of bitartrate with any salt of potash distinguishes it from citric acid, and the absence of sulphuric acid is shown by the absence of effect upon chloride of barium, and by the precipitate of tartrate of lead being soluble in nitric acid. When tartaric acid is sold in the form of powder it is not unfrequently adulterated by the admixture of bisulphate of potash. It is therefore very necessary to test the powdered acid for the presence of sulphuric acid.

Medicinal properties and uses.—*Refrigerant and laxative.*—Tartaric acid is adapted to most of the cases in which the vegetable, or dilute mineral acids are employed. The only instances in which it may not be used as a substitute for lemon juice, or the more expensive citric acid, is in the treatment of scurvy, and rheumatism or gout, in which it is not nearly so efficacious, and in making effervescing draughts with the bicarbonate of *potash.* With this salt it forms bitartrate, if added in the slightest excess; but it may be employed if bicarbonate of *soda* is substituted for that of potash. As its equivalent is higher than that of citric acid, a larger quantity is required for neutralising the different alkalies, but the difference is so small (gr. j in ʒj). as to be practically quite immaterial.* If long continued, it is liable to disorder the bowels. In one instance, ℥j taken at once caused death.†

Dose.—Almost *ad libitum* in every case in which it is given.

Officinal preparation.—Pul. Efferv. Tartar.

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* See ACID. CITRIC. p. 79.

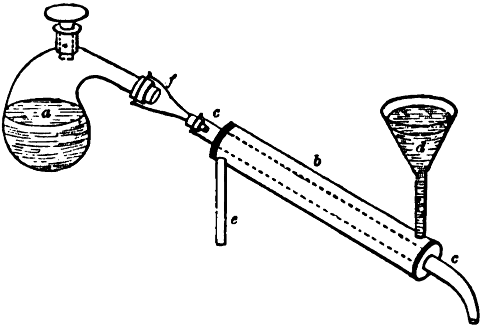
† Ph. Jour. Feb. 1845.

ÆTHEREA.

ÆTHERS.

Description of Liebig's Condenser.

As this apparatus is frequently ordered to be used in making the following ethereal preparations, it may be conveniently described in this place. It consists of a japanned tin tube *b*, perfectly closed at each end by a cork or other substance, which is perforated so as to allow a smaller tube *c*, *c*, to pass though it. This tube must be made of glass, and is connected at its upper end with the retort, whilst its lower extremity allows the distilled liquid to drop into any suitable receiver. The funnel *d*, is soldered to the lower end of the condenser *b*, and to the upper end an open pipe *e*, is also soldered. Cold water or iced water is to be constantly running into the funnel *d*, by which the lower end of the condenser is kept constantly cold. The water fills the tube *b*, and runs continually away by the pipe *e*. By this means therefore the pipe *c c*, through which the distilled products must pass, is kept constantly cold, and vapours are much more perfectly condensed than by an ordinary worm.



a. Retort containing materials.
b. Refrigerator.
c c. Tube passing through the centre.
d. Funnel supplying cold water at the lower end of the refrigerator.
e. Escape pipe from the upper end of the refrigerator.
f. Adapter for connecting the retort and refrigerator.

ETHER, *L. D. E.*

Synonyme. Æther Sulphuricus, *Ph. L.* 1836 (*D. E.*).

The London College does not give any directions for its preparation. The following are taken from the Dublin Pharmacopœia, with which the Edinburgh essentially agrees.

Take of Rectified spirit, three pints.
Oil of vitrol of commerce, eight fluid ounces.
Fresh-burnt lime, in fine powder, one ounce.

Mix the acid and ten ounces of the spirit in a glass matrass capable of holding a quart at least, and, without allowing the mixture to cool, connect the matrass with a Liebig's condenser, and applying a sufficient heat to maintain the liquid in brisk ebullition, commence the distillation. As it proceeds, admit gradually, through a glass tube traversing the cork of the matrass, the remainder of the spirit, regulating its influx so that the boiling liquid shall maintain a constant level; and when the entire of it has been introduced, continue the application of the heat until the contents of the matrass become black and show a tendency to froth over. (The tube through which the spirit enters should dip by its lower extremity, where its diameter is contracted at least half an inch beneath the surface of the liquid in the matrass; and the eduction pipe of the reservoir for the spirit, with which the exterior extremity of the glass tube is connected, should be furnished with a stop-cock to regulate the descent of the spirit. This reservoir also should be placed at least three feet above the level of the boiling liquid.) The crude ether thus obtained is to be agitated with the pulverised quick lime, and then rectified, the distillation being continued as long as the product, on being well shaken, continues to have a specific gravity lower than ·750 (·735, *E.*). The resulting liquid should be preserved in a cool place in accurately stopped bottles.

A fresh reservoir being attached to the further end of the condenser, and the distillation resumed, a product will be obtained which may be substituted for rectified spirit in a subsequent ether process.

E. Rectified spirit f℥L, sulphuric acid f℥x, lime recently slaked ℥ss, saturated solution of muriate of lime f℥xvi.

(The directions are similar to the Dublin ones as far as "constant level.")

When forty-two ounces have distilled over, and the whole spirit has been added, the process may be stopped. Agitate the impure ether with the solution of muriate of lime containing half an ounce of lime recently slaked. When all odour of sulphurous acid has been thus removed, pour off the supernatant liquor and distil it with a very gentle heat so long as the liquid which passes over has a density not above ·735. More ether of the same strength is then to be obtained from the solution of muriate of lime. From the residuum of both distillations a weaker ether may be obtained in small quantity, which must be rectified by distilling it gently again from fresh-slaked lime.

Remarks.—The object of distilling the crude ether from the muriate of lime and the slaked lime, is to get rid of a little water which has come over with the ether in the first distillation. A small accidental quantity of sulphurous acid is also removed by it.

Process.—When sulphuric acid is mixed with an equal weight of spirit and heat is applied, a change takes place by which the alcohol loses some of its elements, which are converted into water, whilst the remainder are converted into ether; and the acid remains in a diluted state. Alcohol consists of

2 eqs. carbon, 3 eqs. hydrogen, and 1 eq. oxygen = Alc. 23.

Therefore 2 eqs. of alcohol consist of - - - - $C^4\ H^6\ O^2$

$$\begin{array}{lll} \text{but 1 eq. of ether consists of} & - & \left.\begin{array}{r} C^4\ H^5\ O \\ H\ O \end{array}\right\} = C^4\ H^6\ O^2 \\ \text{and 1 eq. of water} \quad ,, & - & \end{array}$$

It is therefore evident that if 1 eq. of hydrogen and 1 eq. of oxygen, which form water, be taken from 2 eqs. of alcohol, 1 eq. of ether will remain.

It was at one time supposed that the sulphuric acid, owing to its great affinity for water, deprived the alcohol directly of some of its oxygen and hydrogen to form this compound. But Mr. Hennel has shown that an intermediate change takes place before it acquires any additional water. Part of the acid giving up its water combines with the alcohol, and forms *sulphovinic acid;* so that before heat is applied there exist in the mixture *sulphovinic* and dilute sulphuric acids. As soon as this is heated, the sulphovinic acid is decomposed, and ether and dilute sulphuric acid are formed. The ether is then distilled, and the acid remains in the retort.

These changes may be represented by the following diagrams:—

$$\left.\begin{array}{ll} \text{2 eqs. alcohol} \ - & 2\text{Alc} \\ \text{4 eqs. (hydrated)} & \\ \quad\text{sulphuric acid} & 4SO^3 + 4HO \end{array}\right\} = \left\{\begin{array}{ll} \text{1 eq. sulphovinic} & \\ \quad\text{acid} \ - \ - & \underline{2\ \text{Alc} + 2SO^3} \\ \text{2 eqs. bihydrated} & \\ \quad\text{sulphuric acid} & 2SO^3 + 4HO \end{array}\right.$$

On the application of heat, the sulphovinic acid is decomposed, and,

$$\begin{array}{l} \text{1 eq. sul-} \\ \text{phovinic} \\ \text{acid} \end{array} \left\{\begin{array}{l} \text{2 eqs. Alc, } C^4H^6O^2 \\ \text{2 eqs. sulphuric} \\ \quad\text{acid} \end{array}\right\} = \left\{\begin{array}{l} \text{1 eq. ether} \quad - \ C^4H^5O \uparrow \\ \text{2 eqs. sulphuric} \\ \text{acid + 1 eq. water } 2SO^3 + HO \end{array}\right.$$

The sulphovinic acid is not, like so many compounds of modern chemistry, merely hypothetical; but it may be obtained in a separate state by decomposing sulphovinate of barytes by sulphuric acid. Sulphate of barytes is thrown down, and the sulphovinic acid remains in solution. This may be neutralised with potash, and from this sulphovinate of potash Mr. Hennel obtained ether by heating it with sulphuric acid (*Turner*).

Composition.—Ether consists, as before mentioned, of $C^4\ H^5\ O$; but there are three different opinions as to the way in which these elements are combined. They may exist in the state represented by the above symbol; but it is generally supposed that ether is a "*radicle*" combined with oxygen or with water. Two "radicles have been proposed, which are termed *ethereum* or *etherine*, and *ethule*. *Ethereum* consists of $C^4\ H^4$; and if the elements of 1 eq. of water be added, the proportions then present will form ether. *Ethule* consists of $C^4\ H^5$, and therefore only requires the addition of oxygen to convert it into ether. Professor Daniell, supports the view that ether is a hydrate of ethereum, whilst Kane conceives it to be an oxide of ethule. It will be seen from the following diagram that either of these views may theoretically be true. The objection to them hitherto has been that the radicles have not been obtained from ether, and are therefore purely hypothetical in relation to it; but ethereum has been obtained from coal gas, and ethule is stated to have been obtained in Prof. Bunsen's laboratory by Mr. Falkland.*

El represents Ethule, $C^4\ H^5$; En, Ethereum or Etherine, $C^4\ H^4$.

Ether - -	- - -	- $C^4\ H^5\ O$	= Eth, eq. 37.
Oxide of ethule -	- 1 eq. ethule	- $C^4\ H^5 + O$	= El, O, eq. 37.
Hydrate of ethereum	- 1 eq. ethereum	- $C^4\ H^4 + HO$	= En, HO, eq. 37.

From this statement it is evident that *ether* is a more correct appellation for this compound than *sulphuric ether*, inasmuch as no sulphuric acid enters into its composition.

Professor Graham has made some experiments which show that when sulphuric acid is mixed with six or eight times its volume of alcohol, and heated under pressure in a closed vessel to a temperature varying from 284° to 352°, very little sulphovinic acid is produced; but ether is formed in large quantity by what he terms the "*polymerising*" influence of the sulphuric acid. The meaning of the term is "forming many parts," and he appears to mean by it, that the acid, "by coming in contact with the alcohol," makes two of its measures, parts, or equivalents, into one; and thus combines two atoms of alcohol into one atom of ether; an equivalent of water being however separated from them as in the old theory. These views however require confirmation.†

Properties.—Sulphuric ether is a colourless, limpid, transparent fluid, of an agreeable smell and a pungent taste. It is extremely volatile; and its vapour, when mixed with air and respired, produces effects closely resembling those caused by nitrous oxide gas. When recently prepared it is not at all acid; but after long keeping it reddens litmus paper, owing to the formation of acetic acid by the absorption of oxygen from the air. According to Mitscherlich its specific gravity is 0·724 at 55° Fahrenheit; when its density exceeds this, it contains either alcohol or water, or both. At 30° below zero it begins to assume a foliated appearance; and at 17° lower it becomes a white, solid, crystalline mass (*Phillips*).

Owing to the extreme volatility of ether, a considerable quantity evaporates, even while being poured from one vessel to another; and during evaporation it produces much cold, as may be felt by pouring it on the hand. If a small thin glass tube enveloped in cotton wool, and containing a few drops of water, is placed in a wine glass containing ether, and the whole is put under the exhausted receiver of an air-pump, the water will be frozen in a few minutes.

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* Athenæum, June 23. 1849.

† Pharm. Journ. Jan. 1851.

Under ordinary circumstances, ether boils at about 96° F., and *in vacuo* at 44° below zero. It is very inflammable, and its combustion produces carbonic acid and water. When a coil of red-hot platinum wire is suspended over a vessel of ether, it continues at this temperature until the whole of the ether is consumed; and an acid is formed in its place, which Daniell at first thought to be peculiar, and termed lampic acid; but further observation proved it to be merely acetic acid, formed by the combination of the ethereal vapour with atmospheric oxygen, which changes it into acetic acid and water.

$$\text{1 eq. ether, } C^4H^5O+O^4 \text{ (from the air)} = \text{1 eq. acetic acid, } C^4H^3O^3+2 \text{ eqs. water, } 2\,H\,O.$$

Ether is but slightly soluble in water (f ℥j of ether in f ℥x of water), and when the proportion of ether present is larger than the above it mixes for a time with the water when they are shaken together; but on standing at rest the excess of ether gradually separates, and may be seen as a distinct stratum floating on the surface of the water. It is soluble in alcohol in every proportion, and if it is adulterated with this liquid, the mixture may be detected by agitation with water, which dissolves the spirit, but leaves the ether. It dissolves resin and caoutchouc, and has the remarkable property of dissolving also bichloride of mercury and removing it from its solution in water or in organic fluids. This is a very convenient and important property in medico-legal investigations in cases of poisoning by this substance.

Characters and tests.—Colourless. Sp. gr. not above ·750, *L.D.* (·735, or under, *E.*) When exposed to the air, it flies off in vapour; it affects litmus with a red colour, either very slightly or not at all. Half a pint of water is necessary to mix perfectly with a fluid ounce of ether.

(When agitated in a minim measure with half its volume of concentrated solution of muriate of lime, its volume is not lessened. *E.*)

The specific gravity in the London Ph. is too high for ether, which is perfectly free from spirit or from water; but the quantity of either is very trifling at ·750. If much of either were present, it would not require half a pint of water to dissolve an ounce of the ether. The entire absence of either is proved by the muriate of lime test of the Ph. Ed. Ether, when long kept, becomes acid, and then changes the colour of litmus more powerfully; and if not carefully purified, a small quantity of sulphurous acid may be present and produce the same effect.

Medicinal properties.—*Highly diffusible stimulant, and antispasmodic.* Its action is very rapid and powerful, but quickly ceases, being much less permanent than that of alcoholic compounds. It relieves spasmodic pains and contractions, spasmodic flatulence, and the pains of hysteria. In cases of extreme prostration from fever or temporary causes, it produces a temporary revival, which allows time for the exhibition of more permanent remedies. If taken habitually it soon loses its power, and a much larger dose is required. As much as a pint has been taken daily in scirrhus of the stomach, without producing any remarkable effect. In very large doses it sometimes causes giddiness and stupor resembling apoplexy.

Uses.—*Spasmodic asthma*, during the paroxysm. It has no tendency to prevent its recurrence. In *flatulent colic* and *hiccough*. In *nervous headache*, with severe throbbing, but unaccompanied with vascular excitement. In the last stages of *fever*. In *fainting* and *asphyxia*. It may be taken in the state of vapour, to relieve the *dyspnœa* of *emphysema*, or *spasmodic asthma*, and *chronic catarrh*, or *hooping cough*, by dropping some ether upon hot water, and inhaling the vapour. In the *passage* of *biliary calculi*, and in *scirrhus* of the *stomach*, &c. In *violent palpitations*, whether dependent or not upon organic disease of the heart, ether is sometimes useful. After the accidental inhalation of chlorine the vapour affords considerable relief. For an account of the effects of ether when inhaled, see CHLOROFORMYLE. *Topically*, it is applied to a *strangulated hernia*, to produce cold and consequent contraction, by its evaporation; and it is also dropped upon the forehead, to relieve *nervous headache*.

It is sometimes used as a test for the purity of certain substances, which are or are not soluble in it.

Dose.—f ʒss to f ʒij (but it is seldom employed, compared with the Sp. æth. sulph.), in any convenient vehicle. One ounce of water will not dissolve quite a drachm of ether. The United States Dispensatory says that it may be diffused in water or any aqueous mixture, by triturating it with two grains of spermaceti to each drachm of ether.

ÆTHER ACETICUS.

ACETIC ETHER.

This ether is not officinal in any of the pharmacopœias. It is prepared by two or three different methods, thus described by Brande (*Man. of Chem.*).

Take of Concentrated acetic acid 63 parts,
Sulphuric acid 17 „
Alcohol 100 „
Distil 125 parts into a receiver carefully cooled.

Or, take of Acetate of potash 3 parts.
Absolute alcohol 3 „
Sulphuric acid 2 „

Distil to dryness. The product is then mixed with one-fifth part of sulphuric acid, and, by careful re-distillation, acetic ether equal in volume to the alcohol may be obtained.

This product is to be rectified by re-distilling it from slaked lime and chloride of calcium, which remove some water and free acid that are always present in the distilled fluid.

Composition.—Acetic ether consists of $C^8 H^8 O^4$, eq. 88. It may be considered as a compound of

1 eq. ether + 1 eq. acetic acid = $C^4 H^5 O + C^4 H^3 O^3$, or of 1 eq. etherine + 1 eq. water + 1 eq. acet. acid = $C^4 H^4 + HO + C^4 H^3 O^3$.

Properties.—Acetic ether has an agreeable odour, and appears to be present in some wines, to which it imparts a peculiar flavour. It is not quite so volatile as sulphuric ether, as it does not boil below 165°. Its specific gravity is ·89. It is soluble in seven times its weight of water, and is dissolved by alcohol and ether in every proportion.

Medicinal properties and uses.—Acetic ether resembles sulphuric ether in its general properties, but is less stimulating and acts more upon the skin. I am not aware that it is used internally in this country, but its vapour is employed by Mr. Neill in the treatment of *chronic opacity of the cornea* (see Acid. Hydrocyan. Dil. Uses); and the ether itself is employed in the Liverpool Eye and Ear Infirmary as a stimulant application to be dropped into the ear in cases of deafness depending upon either an undue secretion of wax, or upon a deficiency of the natural secretion. Mr. Neill thinks that the formation of cataract is sometimes retarded, if not entirely suspended, by the application of the vapour of this ether to the eye, in the manner referred to above.

Dose.—When taken *internally*, ♏xxx to f ʒj; when used in *vapour*, ♏x twice a day; when used as a *drop for the ear*, ♏xxx to f ʒij of olive oil.

OLEUM ÆTHEREUM, *L.*

ETHEREAL OIL.

Synonyme. Oleum Vini. Sulphate of Ether.

Take of Rectified spirit, two pints.
Sulphuric acid, thirty-six fluid ounces.

Solution of potash,
Distilled water, of each a fluid ounce, or as much as may be sufficient.

Mix the acid cautiously with the spirit. Let the liquor distil until a black froth arises; then immediately remove the retort from the fire. Separate the lighter supernatant liquor and expose it to the air for a day. Add to it the solution of potash, first mixed with water, and shake them all together. Lastly, when well washed, separate the ethereal oil which subsides.

Remarks and process.—The *proportions* used in this preparation differ from those employed in making sulphuric ether, though the *ingredients* are the same. The products of the distillation are a small quantity of ether, water, sulphurous acid, and a yellow oil, fluid. The ether and water are formed as was described in the section upon ether, p. 124., and the sulphurous acid is derived from the decomposition of a portion of the sulphuric acid by the alcohol, which is itself also decomposed, its carbon forming the black froth that appears towards the close of the operation. The lighter liquid, which is to be separated, consists of the oleum ethereum, a little ether dissolved by it, and a small proportion of sulphurous acid. When this is exposed to the air, the ether evaporates; and the sulphurous acid is afterwards neutralised by shaking the oil with the solution of potash. When this is allowed to stand at rest, the oil separates, and can be obtained pure.

Properties.—Ethereal oil is a yellow fluid, somewhat resembling oil of lavender in appearance; it has a penetrating aromatic odour; its taste is rather sharp and bitter; it is insoluble in water, but is dissolved by ether and by alcohol. When long kept it deposits a peculiar carburet of hydrogen, in long prismatic crystals.

Characters and tests.—Sp. gr. 1·05. It instantly subsides in the form of globules, when dropped into water. It is dissolved by ether, and does not change the colour of litmus.

The last character proves that it has been perfectly freed from sulphurous acid.

Composition.—This is not constant; but, according to Serullas and Dumas, it contains sulphuric acid, carbon, hydrogen, and oxygen, nearly in the proportions requisite to form

1 eq. of ether (oxide of ethule) - $C^4 H^5 O = 37$
1 eq. of sulphuric acid - - $= 40$

1 eq. oleum ethereum, $ElO + SO^3$, eq. 77

From this constitution it appears that the name of sulphuric ether would be more correctly applied to this oil than to the ether which was formerly distinguished by that name. Sulphate of ether is a title sometimes given to this compound.

Medicinal properties and uses. — It is *stimulant*, and is supposed also to be slightly *narcotic;* but it is never used alone. It forms an ingredient in the spiritus ætheris (sulphurici) compositus; for which purpose only it is introduced into the Pharmacopœia.

SPIRITUS ÆTHEREUS NITROSUS. *D.*

See SPIRITUS ÆTHERIS NITRICI (below).

SPIRITUS ÆTHERIS COMPOSITUS, *L.*

Synonyme. Spiritus Ætheris Sulphurici compositus, *Ph. L.* 1836.
Spiritus Æth. Vitriolici comp. Hoffman's Anodyne Liquor.

Take of Ether, eight fluid ounces.
Rectified spirit, sixteen fluid ounces.
Ethereal oil, three fluid drachms.
Mix.

Remarks. — The spirit renders the ether and ethereal oil miscible with water.

Medicinal properties and uses. — This is a valuable *antispasmodic* and *stimulant;* and is given in the low stages of fever, and to relieve *spasmodic pains*, *colic*, and *hysteria*. It is a useful addition to laudanum, when given to procure sleep, and often prevents the opium from exciting nausea. In low intermitting fever a full dose, ♏xl to ♏lx, sometimes produces sleep without an opiate.

Dose. — ♏xx to f℥j.

SPIRITUS ÆTHERIS NITRICI, *L. D. E.*

SPIRIT OF NITRIC ETHER.

Synonyme. Spiritus Æthereus Nitrosus, *D.* Sweet Spirit of Nitre.

Take of Rectified spirit, two pints.
Nitric acid (sp. gr. 1·42) three fluid ounces and a half.

Add the acid gradually to the spirit, and mix; then let twenty-eight fluid ounces distil.

Remarks. — The acid now ordered is of sp. gr. 1·42, whilst that formerly used by the London College, and still ordered by the Phar. D. and E. was of sp. gr. 1·5. For some consequences resulting from this difference, see Mr. Alsop's experiments, p. 133.

The directions in the Dublin and Edinburgh Pharmacopœias, which nearly correspond with each other, are more minute.

Ph. D. Take of Rectified spirit, two pints and eight fluid ounces.
Pure nitric acid (sp. gr. 1·5) three fluid ounces.
Water, one ounce.
Solution of ammonia a sufficient quantity.

Place six ounces of the spirit in a glass matrass capable of holding a quart, and connect this with a Liebig's condenser, whose further extremity is fitted loosely by a collar of tow into a thin eight-ounce phial. Add now the water to the nitric acid; and, having introduced half of the resulting solution into the matrass, through a safety syphon tube, close the mouth of this tube with a cork, and apply for a few moments a gentle heat, so as to cause a commencement of ebullition. When the action (which shortly after commencing proceeds with much violence, and should be moderated by the external application of cold water) has relaxed, introduce gradually the remainder of the acid, so as to restore it. The action having entirely ceased, agitate the distilled product with half its bulk of the solution of ammonia; allow the mixture to rest for a few minutes; and, having separated the supernatant ethereal liquid, mix four ounces of it with the rest of the spirit and preserve the product in a well stopped bottle.

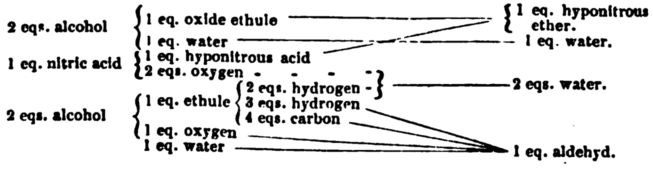
Ed. Rectified spirit Oii and f℥vi. Nitric acid (sp. gr. 1·5) f℥vii. Put fifteen fluid ounces of the spirit, with a little clean sand, into a two pint matrass, fitted with a cork, through which are passed a safety tube terminating an inch above the spirit, and another tube leading to a refrigeratory. The safety tube being filled with pure nitric acid, add through it gradually f ʒiij ss of the acid. When the ebullition, which slowly rises, is nearly over, add the rest of the acid gradually, f℥ss at a time, waiting till the ebullition caused by each portion is nearly over, before adding more, and cooling the refrigeratory with a stream of water, iced in summer. The ether thus distilled over being received in a bottle, is to be agitated first with a little milk of lime, till it ceases to redden litmus paper, and then with half its volume of concentrated solution of muriate of lime. The pure hyponitrous ether thus obtained, which should have a density of ·899, is then to be mixed with the remainder of the rectified spirit, or exactly four times its volume. Its density by this process is ·847.

Note. — The condenser and receiver must be kept cold by ice and salt, or by a mixture of eight parts of sulphate of soda in small crystals, and five of commercial muriatic acid. Spirit of nitric ether ought not to be kept long, as it always undergoes decomposition, and becomes at length strongly acid, *E.*

Process. — When nitric acid acts upon alcohol, a great rise of temperature is produced; both the acid and the spirit are decomposed, and various products are formed, which depend upon the proportions employed and the degree of heat which is applied. When the proportions are such as are directed by the Pharmacopœia, and the temperature at which the distillation is carried on is moderate, the nitric acid is changed into hyponitrous acid by the loss of two of its equivalents of oxygen, which combine with some of the hydrogen of the spirit. The spirit is converted into ether and water, the former of which combines with the hyponitrous acid, and forms hyponitrous ether, which being dissolved by some undecomposed spirit is distilled as spiritus ætheris nitrici. When made according to the Edinburgh or Dublin Pharmacopœias, hyponitrous ether alone is distilled, and is afterwards mixed with the proper quantity of spirit. The heat evolved during the process itself is sufficient for the distillation of the whole of the ether. A small quantity of free acid and a little water are also distilled, the former of which is separated by agitation with the lime or ammonia, and the latter by mixture with the solution of muriate of lime.

At the same time, however, other compounds are formed by changes in the composition of some of the superfluous spirit. A fluid termed aldehyd (and occasionally also acetic and oxalic acids) are produced, owing to the oxidation of the carbon as well as the hydrogen of the spirit, by the oxygen of the nitric acid. According to Dr. Golding Bird[*], the aldehyd is generated, but does not appear in the distilled liquid, until the formation of ether has nearly ceased; and he attributes the pungent acrid flavour frequently noticed in the spirit of nitric ether to the presence of that compound.

The following diagram, copied from Pereira's Mat. Med., illustrates the essential changes which take place; which are, that the nitric acid by losing oxygen becomes hyponitrous acid, which combines with ether from half the alcohol forming hyponitrous ether. The remaining alcohol combines with the oxygen lost, and forms aldehyd and water. If the heat is continued too long, or is too great, some of the carbon also is oxidised, and acetic or oxalic acid is formed.



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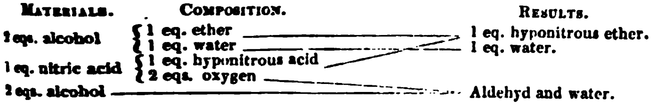
[*] London and Edin. Phil. Mag. vol. xiv. p. 324.

Or, more simply thus: —



It is stated by Mr. Alsop* that the product of this process varies considerably with varieties in the mode of operating. When a few ounces only of spirit, and of nitric acid of sp. gr. 1·375, instead of 1·5, were used, and the deficiency in strength was compensated by an increased quantity of acid, scarcely any ether was present in the portion ordered to be distilled; but a large quantity was obtained on continuing the distillation, from the fluid remaining in the retort. When the quantities were those prescribed in the Pharmacopœia of 1836, and the acid was of sp. gr. 1·5, ether formed throughout the process, and a very fair sample of spiritus ætheris nitrici was obtained, but still a large proportion of ether remained behind.

In Germany it is customary to adopt Liebig's method, which is to form hyponitrous acid by the action of starch or sugar upon nitric acid, which is then conducted into a cooled, two-necked receiver containing alcohol. This is rapidly converted into hyponitrous ether, and passes through the second neck of the bottle into a condenser. It may afterwards be mixed with a sufficient quantity of spirit, to make it correspond with the officinal preparation. During the process a small portion of hydrocyanic acid is formed, which Mr. Bastick has found to amount to $\frac{1}{8}$ gr. in 100 grains of spiritus ætheris nitrici. He has examined this compound when prepared according to the pharmacopœial directions, but has not found a trace of hydrocyanic acid present in it.† Mr. Dalpaiz, on the contrary, found that a small portion of this acid was formed when he used nitric acid sp. gr. 1·5, and still more when he used a weaker acid, and in smaller quantity, and applied a higher temperature. He found that moderating the temperature of the mixture diminished or entirely checked the formation of the hydrocyanic acid. He scarcely detected any of this acid in commercial spiritus ætheris nitrici.‡ The residual liquor obtained from manufacturing fulminating quicksilver, which consists chiefly of spirit and nitric acid, is used by some persons for the preparation of spiritus ætheris nitrici, and always produces a considerable quantity of hydrocyanic acid.

Properties. — Spiritus ætheris nitrici is colourless, very volatile, and has a rather fragrant odour; its flavour is peculiar, and to many palates sickly. It is very inflammable, changes litmus paper slightly red, and discharges the colour from syrup of red poppy when mixed with it for some time. It readily undergoes change, and becomes more acid when long kept. It is soluble in water and alcohol in every proportion.

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* Pharm. Journ. March, 1844, p. 425., *et seq.*

† Pharm. Journ. Dec. 1843, p. 278.

‡ Journ. de Pharm. quoted in the Pharm. Journ. May, 1844, p. 545.

Characters and tests.—Sp. gr. ·834 (·847, *E.*). It slightly changes the colour of litmus, red. Carbonate of soda being added, no bubbles of carbonic acid escape.

It effervesces feebly or not at all with bicarbonate of potash. When agitated with twice its volume of concentrated solution of muriate of lime, 12 per cent. of ether slowly separates, *E.*

The principal adulterations are nitrous acid, formed when it is long kept, in which case it effervesces with carbonates; and too much spirit or water fraudulently mixed. The specific gravity is intended to show this fraud, and the muriate of lime test is prescribed in the Ed. Ph. with the same intention.

Medicinal properties. — *Diuretic*, *diaphoretic*, and *refrigerant.* It generally acts as a refrigerant in allaying thirst and fever; but in some constitutions it increases these symptoms. This circumstance has, however, been attributed to the use of an adulterated specimen. If its use is long continued, it sometimes causes salivation, which is occasionally distinguished with difficulty from mercurial salivation, as there are both fetor of the breath and redness of the gums.

Uses.—In *fever*, especially in children, combined with liquor ammoniæ acetatis. In *dropsy*, combined with squill or digitalis. In *gonorrhœa*, during the acute stage, combined with nitrate of potash and plenty of barley water, and, at a later stage, combined with an equal quantity of copaiba. In *strangury* produced by the application of a blister.

Dose.— ♏x to ♏xl in any suitable vehicle.

Incompatibles.— Spirit of nitric ether should not be prescribed in any mixture coloured with red poppy syrup, as it quickly discharges the colour. It affects syrup or tincture of saffron less than any other colour.

SPIRITUS ÆTHEREUS OLEOSUS, *D.*

(Liquor Æthereus Oleosus.)

Spirit of Ethereal Oil.

Take of Rectified spirit, one pint and a half.
Oil of vitriol of commerce, one pint and a half.
Sulphuric ether, five fluid ounces.

Mix the oil of vitriol with one pint of the rectified spirit in a matrass of glass, and, connecting this with a Liebig's condenser, apply heat, and distil till a black froth begins to rise. Separate the uppermost or lighter stratum of the distilled liquid, and having exposed it in a capsule for twenty-four hours to the atmosphere, let the residual oil be transferred to a moist paper filter, and washed with a little cold water, so as to remove any adhering acid. Let it now be introduced into a bottle containing the remainder of the spirit mixed with the ether and dissolved.

Remarks.—This preparation is very similar to the spiritus ætheris comp. of the Ph. Lond. The first part of the process corresponds with that for making oleum ætherum, and the result is then mixed with ether and spirit, as in that preparation.

Uses and dose.—The same as Sp. Æth. Comp. p. 130.

SPIRITUS ÆTHERIS SULPHURICI, *E.*

Spirit of Sulphuric Ether.

Take of Sulphuric ether, a pint;
Rectified spirit, two pints.

Mix them. The density of this preparation ought to be ·809.

Remarks.—This preparation must not be confounded with the sp. æth. comp., formerly called spiritus ætheris sulphurici compositus of the Ph. L., as it differs from it materially in flavour, owing to the absence of the ethereal oil; and owing to the same cause it is supposed not to be equally sedative or soporific in fever, though it is equally useful as a *stimulant* or *antispasmodic.*

Dose.—♏xx to f℥j.

CHLOROFORMYLE, *L. D.* CHLOROFORMUM, *D.*

Synonyme. Chloroform. Terchloride of Formyle. $(C^2H + Cl^3.)$

Take of Chlorinated lime, four pounds.
Rectified spirit, half a pint.
Water, ten pints.
Chloride of calcium, broken into pieces, a drachm.

Put the lime first mixed with the water, into a retort, and add the spirit to them, so that the mixture may fill only the third part of the retort. Then heat them in a sand-bath, and as soon as ebullition begins, withdraw the heat as quickly as possible, lest the retort should be broken by the sudden increase of heat. Let the liquid distil into the receiver so long that there may be nothing which subsides, the heat being reapplied if necessary. To the distilled liquid add a quarter of the water, and shake them all well together. Carefully separate the heavier portion which subsides, and add the chloride to it, and frequently shake them for an hour. Lastly, let the liquid distil again from a glass retort into a glass receiver.

Ph. D. Take of Chlorinated lime, ten pounds.
Fresh burnt lime, five pounds.
Water, four gallons.
Rectified spirit, twenty-five ounces.
Peroxide of manganese, in fine powder, two drachms.

Slake the lime with a quart of the water, first raised to the boiling temperature, and having placed the slaked lime and the chlorinated lime in a sheet-iron or copper still, pour on the residue of the water, first mixed with the spirit and raised to a temperature of 100°. Connect now the still with a condenser, and apply heat, which must, however, be withdrawn the moment the distillation commences. The distilled product, the bulk of which need not exceed a quart, will occur in two distinct strata, the lower of which is the crude chloroform. Let this be agitated twice in succession with an equal volume of distilled water, and then in a separate bottle with half its volume of pure sulphuric acid. Lastly, let it be shaken in a matrass with the peroxide of manganese, and rectified from off this at a very gentle heat.

The lighter liquid which distils over with the chloroform, and the water used in washing the latter, should be preserved with the view of their being introduced with a new charge into the still in a subsequent process.

Remarks.—When the materials above prescribed are mixed and gently heated together, a very sudden increase of temperature takes place, accompanied by violent action, almost amounting to an explosion. To prevent the retort from being broken, it must be of a large size, and the heat must be withdrawn the moment the action commences. During the process, the spirit is decomposed, part of its constituents being arranged so as to form a "radicle," termed formyle, C^2H, which combines with 3 eqs. of chlorine, and forms terchloride of formyle, C^2H+Cl^3. The London name, chloroformyle, more nearly expresses its composition than the ordinary one of chloroform.

Characters and tests.—Colourless; of an agreeable odour; its sp. gr. is not less than 1·48 (1·496 *D.*). It is scarcely at all soluble in water. It does not change the colour of litmus to red. It soon flies off when rubbed upon the skin, scarcely any smell remaining.

Adulterations.—The most probable is the presence of spirit mixed with the chloroform; and the lower the specific gravity the worse the sample. It can be obtained as high at 1·5. At present, no satisfactory tests are known, except the specific gravity, to guard against impurity. The effect of sulphuric acid, when agitated with it and left at rest, is often relied on; the darker it becomes, the worse the specimen; but there are many fallacies which prevent this from being perfectly satisfactory.

Medicinal properties and uses.—Anæsthetic. Chloroform is one of a large class of substances which possess the power of suspending sensation, consciousness, and voluntary motion in various degrees; from a merely diminished sensibility to the most profound unconsciousness, terminating even in death. Of these substances ether and chloroform have been the most extensively used and the most carefully studied, and the latter is now employed to the exclusion of all others.

Ether has for many years been known to possess the power, when inhaled from a bladder, of inducing cheerful excitement and violent muscular motions, similar to those caused by laughing gas; and I have often seen it employed for this purpose eighteen years since. But when a large quantity (f℥ss to f℥ij or f℥iij) is inhaled, the excitement generally abates and the muscular motions are subdued until the patient becomes unconscious of pain, and, in many instances, of surrounding objects also, and lies passively under the hands of the operator.

This state of insensibility is sometimes followed by sleep, and is not generally succeeded by depression of the vital powers. The sensations of most patients are agreeable whilst inhaling the vapour of the ether, but some feel almost suffocated, and require frequent draughts of air free from the ethereal vapour; and others, again, experience such distress that they cannot be induced to persevere with its inhalation. When cough and irritation of the bronchial membrane are occasioned, they are generally attributed to the ether having been contaminated with a little spirit, and accordingly, during the period in which ether was employed, great care was exercised to have it well washed with water, that all the spirit might be removed.

Ether is now so entirely superseded by chloroform, that I shall only mention further the differences between them, and leave all notice of their uses for the remarks upon the latter.

Differences between ether and chloroform. — Ether produces much more excitement and more vivid impressions than chloroform, and seldom causes such entire unconsciousness of surrounding objects. It is not generally followed by so much depression as chloroform. It more frequently excites cough and violent muscular actions, rendering an operation difficult. A much larger quantity (on an average, at least six or eight times as much) of ether is requisite to produce the effect, and the difficulty of administering it is greater, some inhaling apparatus being indispensable. The odour of the ether remains much longer about the room and patient.

Medicinal properties and effects.—Chloroform is the most speedy and powerful, as well as the most agreeable, of the class of remedies now known as *anæsthetics*, or agents which possess the power of suspending for a time the mental and sensorial functions. When inhaled, the sensation is to most persons agreeable, sometimes even producing vivid excitement and the most pleasurable sensations; but in others it excites an oppressive feeling of suffocation, which continues until, sensibility being lost, the sensation ceases to be recognised. When produced, it may often be lessened or entirely removed, by withdrawing the chloroform for a few moments and allowing free access of air. When the chloroform is again applied, more air should be inhaled along with it than is necessary in cases in which this painful sensation is not excited.

The amount of unconsciousness varies in different cases from mere partial loss of feeling to the most profound and death-like insensibility. In many cases, especially in midwifery practice, the former is the most favourable condition, and in it the patient, though conscious of the presence of the accoucheur, of the accession of the uterine contractions, and of the passage of the child's head over the perinæum, is still free from pain; and whilst aware that the child is coming into the world, is entirely spared from the suffering which, under ordinary circumstances, attends upon this event. This semi-unconsciousness is obtained when the chloroform is given in small quantities, and only at intervals, free access of air being allowed at times, until the patient begins to speak, or to show signs of returning suffering. When the chloroform is given continuously, and mixed with but little air, the insensibility speedily becomes complete, and the patient lies in a condition of apparently profound coma; the pulse is frequently small, the breathing slow and diminished in force, and the surface of the body is often below the natural temperature. In general the patient soon recovers from this state; but sometimes it terminates in death, as will be noticed hereafter. I shall now point out the injurious consequences which often attend upon the inhalation of chloroform.

Vomiting.—Amongst the immediate effects produced by its administration, vomiting is frequently present. It often seems dependent upon food having been recently taken; but in several instances, neither food nor drink has been swallowed for several hours previously. It is, however, very important to attend to this particular, as in several cases chloroform produces no effect whatever even when inhaled in large quantities, immediately after a full meal.

Headache is another not unfrequent result, though the contrary has often been stated. In some cases this continues for several hours, and in one instance under my notice, it did not entirely disappear for some days. It is principally confined to the forehead.

Convulsions are very frequent, and I use the term "very" advisedly. In one or two reports it is said, "Nearly all the patients operated upon were more or less convulsed;" and in some instances this has rendered an operation almost impracticable. In one case, (tying the brachial artery), the muscles of the arm were so violently affected that the vessel could scarcely be gained, and the accompanying veins were so swollen and turgid as to obscure it even when exposed, rendering the operation very unsatisfactory. In another case, an operation upon the perinæum, the urethra and other parts were so forcibly and suddenly retracted several times, as to remove them from the control of the operator; and in a third case, one of lithotomy, it required the vigorous efforts of four persons to hold the patient on the table, even after being tied up in the proper position. It is impossible to arrive at accurate statistics in the matter, but probably one patient in six or eight is affected with convulsions, more or less severely.

In many cases they are accompanied by frothing at the mouth, whilst in others they resemble common hysterical symptoms. One important caution to be learnt from this is, never to attempt any operation without having an assistant at hand. It has sometimes been supposed that convulsions only occur before the full effect of the chloroform is produced; but in many reports it is distinctly specified that "the patient was fully under its influence," and this has been the case in my own observation. It is fortunate, however, that these convulsions scarcely ever commence *during* the operation: they are generally manifested as soon as the agent begins to take effect, if they are present at all; and therefore a surgeon is not liable to be betrayed into commencing an operation during their absence, and being interrupted by their subsequent appearance. If they are so severe as to interfere with the operation, he has nothing to do but to wait till the effects of the chloroform have gone off, and his patient is then no worse off than if chloroform had not been known.

Depression or prostration.— This is generally produced, more or less, and sometimes to an alarming degree. Chloroform generally diminishes the number of pulsations; and in some instances both the heart and lungs have almost ceased to act, and fears been entertained that the patients would die under the operation; but they have rallied, and done well ultimately. In many cases, however, the depression is very alarming, and amounts to perfect syncope; which is the more to be dreaded, as the patient is in such a state as to forbid the employment of ordinary stimulants, such as brandy, wine, or ether; for, being unconscious, there is extreme danger of fatal suffocation, if any fluid is poured down the throat, from the patient's inability to swallow it. In some cases, though the patients have rallied from the immediate depression, the prostration which remained has never been removed, and the patients have died shortly, when, under other circumstances, the presumption would have been in favour of recovery. In one or two cases, on the other hand, in which the patients are reported to have been at death's door, and pulseless, from uterine hæmorrhage, or prostration otherwise induced, they have rallied under the influence of chloroform, and operations have been safely performed, though ordinary stimulants have been previously tried in vain.

Secondary hæmorrhage.— The reports generally are, "very trifling hæmorrhage," "no secondary hæmorrhage," &c., and in midwifery cases this is striking. In several instances in which there has previously been a disposition to flooding, there has been none when chloroform was used. The result of experience is in favour of this agent, as regards this particular effect.

Excoriation of the lips and nose may be prevented by taking care to avoid direct contact.

Pathological appearances after death from chloroform. — The experiments by Mr. Wakley, in addition to those of Dr. Gibson of Newcastle, Mr. Gore, M. Gruby, and others, have proved indisputably that death may be caused by the inhalation of chloroform vapour, or by its introduction by injection into the vascular system. In all these cases the post-mortem appearances were the same: — "Excessive congestion of the lungs and large vessels of the heart, such as was perhaps scarcely ever witnessed in post-mortem examinations" (*Wakley*). "Enormous congestion of the lungs, so that they appeared almost like one vast apoplectic spot" (*Gibson*). "Great congestion of the lungs; not very great congestion of the vessels of the brain" (*Gore*).

In one respect the experiments of Mr. Gore were particularly interesting in their bearing upon midwifery. He killed a rabbit which was nearly at the full period of utero-gestation, by the repeated inhalation of chloroform vapour, and then extracted six young ones from the uterus of the mother, which all lived for several minutes. I have been struck by the few cases of still-born children in the reports of cases requiring turning or instrumental assistance. It appears as if the child had a better chance of life after the employment of chloroform than without it, as it is usual to have a greater number of still-born children with such cases as have been reported.

From the experiments of M. Gruby, it appears that the uninterrupted inhalation of chloroform for from three to five minutes, caused death in several of the animals experimented upon; whilst similar animals breathed the vapour for upwards of an hour and a half, without injury, if occasional draughts of unmixed atmospheric air were interposed; from which the important inference is to be drawn, that we ought, in every case of its administration, to remove the sponge occasionally, and allow the patient to inspire pure air alone.

The statement that the vitality of the blood is impaired by anæsthetic agents is not in all cases borne out by facts; for in Dr. Snow's report of ether cases he says the blood coagulated firmly in every case, and the jets of blood from divided arteries had the usual vermilion colour; and in a rabbit killed by chloroform, Mr. Gore found that the blood drawn from the jugular and crural veins just before death, coagulated quickly and firmly. But in nearly every case of death in the human subject the blood has been found fluid after death, and the walls of the heart flaccid. (*Warren's Summary of Fatal Cases. Med. Gaz.* Ap. 1849.)

Death from chloroform. — In several cases death has occurred in the human subject under the influence of chloroform, and although at first, attempts were made to show that the patients had died from anything, in short, rather than the chloroform, it is impossible to read the report of these cases without being convinced that the death has been occasioned by this agent. In some instances the patient has at first appeared to be simply insensible as usual, but has been found to be dead without its having been discovered at the time; whilst in other instances he has been talking and asking for more, one moment, and the next has fallen back suddenly, dead. In nearly all the cases reported the death has been startling in its suddenness, and has occurred without premonitory indications which could arouse the fears or watchfulness of the operator; and it has also been so rapid as to render the employment of remedies vain, since they could only be used upon a person already irrevocably beyond the influence of external agents of whatever description. In the fatal cases there has been no uniformity as to the amount inhaled, death having occurred after small quantities more frequently than after inhalation continued for the usual time: and there is no recorded instance of death in which the sufferer has inhaled the enormous quantities which the Edinburgh accoucheurs administer to their patients. This subject has been recently examined with great care by Mr. Ed. Bickersteth of Liverpool, and his paper in the Month. Jour. Med. Science, Sept. 1853, will well repay perusal; but in this place we can merely give a summary of his observations.

In every case (with a single exception) the respiration ceased some time before the heart's action failed; in some cases there was a considerable interval. Hence the imperative *necessity of attending to the state of the respiration, rather than that of the pulse*, for warning of the approach of danger.

In several cases artificial respiration restored the patient after apparent death; both respiration and circulation having entirely ceased in one or two of the cases. But in some of these, artificial respiration was tried in vain, until the tongue was drawn forward out of the mouth. The patient generally lying upon the back, the root of the tongue falls backwards when sensibility has entirely gone, and closes the entrance to the larynx. Hence the first step should be *to draw the tongue well forward and keep it protruding from the mouth* by means of a hook, and then to apply artificial respiration perseveringly.

In some cases when the animal had been perfectly restored by artificial respiration maintained by pure air, the condition of stupor, and eventually death was produced by substituting air loaded with the vapour of chloroform. Hence the importance of *never allowing the handkerchief containing the chloroform to remain upon the patient's face* after the requisite unconsciousness has been obtained. It ought then to be removed, and reapplied if occasion requires it.

In most cases the pulse is at first excited, then frequently becomes small, frequent, and weak, and at last, when anæsthesia is perfect, it almost always becomes tranquil, and *some beats lower than the natural standard*. This is so uniformly observed, that if the respiration continues perfect, an apparent failing in the state of the pulse is not an indication of danger. In some cases, respiration continuing perfect, and insensibility being complete, *the pulse suddenly failed entirely at the moment when the first incision was made.* In all of these the patient recovered without special treatment; but they point to the possibility that the system receives a shock at the commencement of the operation, even during the unconsciousness produced by chloroform. Now, patients have died from shocks upon the operating table before the introduction of this agent, and had the above cases died, the death ought probably to be attributed to the shock, and not to the influence of chloroform. In giving evidence therefore on a coroner's inquest, it will be very important to be sure whether *the breathing or the pulse failed first.* If the former, the experiments now under review make it probable that chloroform would be the cause of death; if the latter, that the shock was the occasion of it. This, however, is a point which both requires and deserves further investigation.

The smallness of the quantity generally administered in those cases in which death has resulted (sometimes not more than f℥ij) is remarkable; and Mr. Lowndes, in a paper read before the Liverpool Med. and Path. Soc., but not yet published, showed some reasons for thinking that the cessation of respiration, and the consequent death, were owing to paralysis or loss of sensibility of the branches of the glossopharyngeal nerve supplying the root of the tongue and neighbouring parts; which, therefore, become both unconscious of the want of air, and insensible to its stimulus. Chloroform is known to produce local anæsthesia when locally applied, and it is therefore quite possible that a local effect may be produced upon these nerves by the earliest portions employed, which will account for death occurring after a small quantity only has been used. If this local effect is not produced immediately, it may never occur at all until the whole nervous system is completely overpowered by an excessive amount of the chloroform, which has hitherto been chiefly seen in experiments upon the lower animals.

Cases in which Chloroform has been administered.

Midwifery.—Labours conducted under the influence of chloroform are generally accomplished in nearly the usual time, but without the fatigue of ordinary parturition. The patients are generally free from the exhaustion so commonly experienced afterwards, and express themselves as if the labour had scarcely been of any consequence, and the recoveries are generally unusually quick and favourable. In many cases, the after-pains are decidedly less than usual, or than they had been in previous labours. If administered prior to the dilatation of the os uteri, no particular effect is uniformly noticed upon it; but when the vagina is hot, dry, and swollen, it often becomes soft and moist almost immediately. In many cases the uterine contractions are decidedly enfeebled, and the intervals lengthened; but so much relaxation of the soft passages is produced at the same time, that the labour is not generally prolonged beyond what might be anticipated had chloroform not been used. In most instances the abdominal muscles act in concert with each uterine contraction, and the legs are generally stretched out at the same time, the patients often uttering a low moan during each pain, but without being subsequently conscious of having suffered. In many cases they are aware of the passage of the child's head over the perinæum, but it is unaccompanied with pain. The placenta is expelled as usual, and there is often less hæmorrhage than common. Experience is decidedly in favour of the safety and utility of its employment; but it is neither necessary nor desirable that a profound state of insensibility should be maintained, every advantage being obtained by a degree of anæsthesia short of perfect unconsciousness — a degree easily kept up by the application of a handkerchief moistened with chloroform when there is any indication of the approach of a uterine contraction.

Obstetric operations. — Chloroform is generally employed before performing the ordinary obstetric operations, but in the *application of the forceps* it is essentially necessary that the *patient should be entirely free from its influence, after the application of the instrument* and *before it begins to be used.* If considered desirable, it may be applied whilst the patient is unconscious, but it has happened, even in the hands of experienced practitioners, that a portion of the uterus or of the soft parts of the mother has been included in its grasp. The pain experienced by a woman as soon as extraction is attempted will, under ordinary circumstances, warn the doctor if anything is wrong; but if unconscious from chloroform, she will give no evidence of pain, even though severe injury is inflicted, such as laceration of the vagina, or of the neck of the uterus. The patient ought, therefore, to be fully conscious when the first efforts at extraction are made, though she may subsequently be placed again under the influence of the chloroform, when the practitioner is satisfied that the instrument has been properly applied.

Surgical operations. — Experience has fully proved the value of chloroform in all cases *except* operations for *strangulated hernia*, in which its utility is questionable. The pain of this operation is generally so slight, and it is so important that the patient should be perfectly quiet, that some surgeons of experience do not use it, in consequence of the liability to convulsions under the influence of chloroform.

In operations *about the mouth or fauces, hare lip*, &c., its employment requires great care, lest the patient should be suffocated by blood trickling to the root of the tongue and obstructing respiration. When perfectly conscious, this is so distressing, that the patient expels it by coughing; but if under the influence of chloroform it may fail to be felt or expelled, and death may be the result. Therefore, although the patient may be in a recumbent posture when the chloroform is administered, he ought always to be erect during the operation; and the mouth should be carefully freed from blood during its continuance.

Strangulated hernia has, in several instances, been speedily reduced under the relaxation produced by chloroform.

Dislocations.—The reduction of an old dislocation should not be attempted until the patient has been rendered insensible. In a powerful muscular man, I reduced a dislocated humerus of thirteen weeks' standing, after the inhalation of chloroform for a quarter of an hour, without the necessity for bleeding or other depressing remedies, and many similar cases have been reported.

Spasmodic Diseases.

Tetanus.—The cases reported are very few: and whilst it has not appeared to have done harm in any, its beneficial effects cannot be considered as established in this formidable disease.

Hydrophobia.—I have only seen the report of two cases, and in them it did no good.

Spasmodic asthma.—Several cases have been reported, and the results are stated to be almost uniformly favourable.

Hooping cough.—Dr. Churchill has reported some cases in which it acted beneficially, and one or two in which it did little good but no harm.

Puerperal convulsions.—I have only seen the report of one case—that by Mr. Rudge—and in this it was very useful.

Chorea.—In the few cases reported it has, upon the whole, been of doubtful value, though highly useful in some of them.

Epilepsy.—The evidence in its favour is stronger in this disease if employed during the fits.

Delirium tremens.—The reports are decidedly in its favour.

Mania.—The reports are very few, and are generally unfavourable.

Tic douloureux.—The reports are generally favourable.

Dysmenorrhœa.—The reports are few, but favourable.

Administration.

Mode.—Generally by means of a handkerchief, doubled two or three times; or of a single thickness of lint laid upon the patient's face; or of a sponge: very rarely by means of any special apparatus.

Quantity.—Twenty to thirty drops very often produce insensibility; but I have administered two fluid ounces without producing even partial unconsciousness, although vomiting did not occur. In this country the quantity given seldom exceeds one to two ounces, and we generally begin with about half a drachm; but in Edinburgh, they often commence with half an ounce, and frequently employ four to six or eight fluid ounces.

Continuance.—The time will vary according to the object to be attained. In Edinburgh, patients have been kept under its influence twenty-four to thirty-six hours, in protracted labour.

Age. — The youngest case I have met with was an infant three months old, successfully operated upon by Dr. Roche, of this town. He gave it five or ten minims in all.

Treatment of alarming symptoms. (See p. 141.)

Is its employment justifiable after the deaths which have occurred? —The general consent of the profession has answered in the affirmative; and the verdicts of coroners' juries have always acknowledged the propriety of its administration.

Local effects of chloroform. — Several cases have been reported in which local anæsthesia has been produced by this substance. When poured upon a sponge and held *near* the perinæum, Mr. Higginson found that the patient was unconscious of pain when the child's head passed over it; and the pain of dysmenorrhœa was speedily relieved by a small quantity of chloroform placed in a curved glass speculum, one end of which was then closed with a sponge. The tube was then partially introduced into the vagina, the heat of which causing the chloroform to volatilise, the vapour relieved the pain, which was stated to be most acute. A drop or two of chloroform upon a piece of lint often relieves the pain of a carious tooth. Several cases have also been reported, in which chloroform painted over a painful, but not inflamed surface, has relieved the pain.

Internal employment of fluid chloroform. — Chloroform is not often given internally in its liquid state, except when dissolved in spirits under the name of chloric ether, and in that preparation the spirit probably modifies its effects. Chloroform itself has, however, been employed in a few cases of *delirium tremens* by Dr. Pratt of Baltimore. In these cases opium and other ordinary treatment had been employed in vain; no sleep could be procured. One drachm of chloroform mixed with water was given, and sleep almost immediately followed; the dose was repeated at intervals of a few hours as the patient awoke and required it. "J. H., treated in the ordinary manner by opium, ether, &c.; no sleep or improvement for three days and nights; strength rapidly sinking from the maniacal exertions made during his delirium. He was now beyond control a raving maniac, a terror to all present; pulse so feeble and frequent that it could not be counted; tongue dry; muttering incoherence; subsultus, and cold and clammy extremities. A tea-spoonful of chloroform given in a little water, and in an hour another equal dose, along with Sp. Æth. Sulph. co. and Tr. Valer. In 15 minutes he was asleep, and slept 3½ hours. His extremities became warm and the pulse calmer, fuller, and firmer, and he awoke rational and refreshed. Dose repeated, and again he slept. The treatment after this was continued as it was required, and the case became an ordinary one."—*Rank. Abs.* vol. xv. p. 1.

ÆTHER CHLORICUS.

CHLORIC ETHER. (Not officinal.)

Remarks. — This preparation is incorrectly named, as it is totally different from the substance known chemically as chloric ether. It is a mere solution of chloroform in spirit, the proportions of the two ingredients being variable, though one part *by weight* of chloroform, to nine parts of rectified spirit, is the average trade formula in this country.

Medicinal properties and uses. — Chloric ether possesses the fragrant odour of chloroform, and has an exceedingly sweet, agreeable flavour. It is a stimulant to a certain degree; but in cases of extreme depression, with the pulse almost extinct, I find that it is not in the least to be relied upon as a diffusable stimulant. It is extensively used as a stimulant; but I believe that in reality its advantage resides in its agreeable flavour, which conceals the bitter of quinine and remedies of that class.

Dose.— ♏xv to ♏xxxv.

ETHER PYROLIGNEOUS. (Not officinal.)

This liquid is a variable compound obtained from the destructive distillation of wood. It has been already stated (p. 71.) that the chief product of such distillation is an impure acetic acid, which is mixed with various other compounds of carbon, hydrogen, and oxygen, viz., creosote, tar, pyroxylic spirit, &c. The first portions of this mixed acid liquor are redistilled two or three times, and an inflammable liquid is obtained termed pyroligneous ether, which is not used in medicine, but is employed for dissolving resinous substances in making varnishes, and for burning in lamps. It is only introduced in this work, because it is the source from which pyroxylic spirit, or, as it is often termed, medicinal naphtha, is obtained.

ALKALINA.

ALKALIES AND ALKALOIDS.

UNDER this head are included both alkalies and the bodies termed alkaloids, which possess alkaline properties, but so feebly developed as scarcely to deserve the name. They are chiefly obtained from the vegetable kingdom.

Definition. — *Alkalies* are bodies which possess a soapy taste resembling carbonate of soda; which change the yellow colour of turmeric to brown or red, and restore the blue colour to reddened litmus; which neutralise acids, forming a class of bodies termed salts; and which, when boiled with oil or fat, form soap. *Alkaloids* possess alkaline properties so far as to change the colour of turmeric slightly, and to neutralise the weaker acids; but they do not possess the soapy taste, nor do they form perfect soaps when boiled with oil.

They possess the medicinal properties of the vegetables from which they are obtained in a high degree, and appear to be the active ingredient. But though this is the case, they do not always act so powerfully, or in precisely the manner which would be expected from the proportion they bear to the amount of the vegetable body yielding them. It appears that, in ordinary cases, the presence of a quantity of inert matter is necessary for the full action of a medicine, which, if given as it were, undiluted, fails to produce an equal effect. (*Paris' Pharmacologia.*)

A curious circumstance has been observed by Dr. Brett, respecting the alkaloids which contain nitrogen when mixed with a small quantity of iodic acid, slightened moistened, gently dried, and then heated over the flames of a lamp. Iodide of nitrogen is formed, and explodes with a detonation so characteristic of this compound, as not to be mistaken. When iodic acid is mixed with such bodies as contain no nitrogen, *e. g.* salicine, and similarly treated, the organic matter decomposes the acid, and the iodine is gradually expelled by the heat, but there is no detonation.

ACONITINA. (Not Off.)

Remarks. — This alkaloid has no longer a place in any of the pharmacopœias, the process formerly employed being so difficult, expensive and uncertain in its results, as to have rendered the alkaloid practically unattainable. The following process was devised by Mr. Headland, and is described in full in Royle's Materia

Medica, from which it is extracted into this place. Mr. Headland uses the Aconitum ferox, instead of the A. napellus, as the former contains a much greater proportion of the alkaloid than the latter. He obtains on an average from 54 to 92 grains from a pound of the root. There are two states in which the root is met with, compact and horny, or friable, and the latter is much richer in aconitina than the former.

Process.—Take of the root of *Aconitum ferox* coarsely bruised 2 pounds, and 3 gallons of rectified spirit. Boil the aconite with a gallon of the spirit for an hour in a retort with a receiver adapted to it Pour off the spirit. Boil the residue with another gallon and with that which distilled over. Pour off again, and do the same a third time. Press the root and mix the solutions. Filter. Distil off the spirit from the tincture thus obtained, until this is of the consistence of thin syrup. Then pour it out of the retort and mix with twice its bulk of *distilled water* and excess of *sulphuric acid.* Filter carefully from the precipitate produced until it is quite clear. Then again evaporate gently in a water bath to the consistence of syrup. Pour this syrupy liquid, which should not exceed two fluid ounces in measure, into a stoppered bottle, of which it shall occupy about one-third. Add then an excess of strong solution of *ammonia*, and shake gently. To the white mass produced add an equal bulk of pure *ether*. Insert the stopper tightly, and, holding the bottle in a damp cloth with a finger on the stopper, shake briskly for a few minutes. Allow then a sufficient time for the ether to rise above the water, and, when it has completely separated, remove the stopper and take up carefully the ethereal solution from the surface of the water with a pipette or common glass syringe. Pour it into an open basin. Again shake up the watery solution with another equal bulk of ether, and remove this in the same manner. Do the same a third time. Let the ethereal solution evaporate spontaneously. The aconitina is deposited.

Explanation.—This process is quick and certain, and it is not difficult, but great care should be taken throughout, on account of the very dangerous nature of the product. The explanation is simple. It is probable that the alkaloid exists in the root in combination with aconitic acid. This aconitate of aconitina is dissolved out by the spirit. When the tincture is evaporated, and a small quantity of water added, a number of resinous and other matters insoluble in water are precipitated. By the sulphuric acid added at the same time a sulphate of aconitina is formed, which is probably more soluble than the natural salt. On the subsequent addition of ammonia the aconitina is precipitated. If there is much of the alkaloid present the solution will become opaque and semi-solid on account of its precipitation. But the ether which is then added dissolves entirely the precipitated alkaloid, carrying it with it to the surface of the water, and leaving behind in the latter the sulphate of ammonia and other substances.

Properties.—The aconitina thus prepared is transparent and vitreous in appearance and of a very light yellow colour, like good gum arabic. It is slightly soluble in water, but readily dissolves in alcohol, and the solution is alkaline to test paper.

Tests and adulterations. — It is so easily adulterated, and is so expensive, that the only safety is in being able to rely upon the maker from whom it is obtained.

Medicinal properties and uses. — Intensely poisonous; $\frac{1}{50}$ of a grain nearly killed a lady to whom it was administered. It is a *local anodyne*, causing numbness in the part to which it is applied; and is used in *tic douloureux* and *sciatica*, in which painful affections it is, if pure, superior to any other known remedy. It is never now administered internally.

Dose and preparations. — There are not any officinal preparations. Dr. Turnbull mixes one grain of aconitina with two drops of olive oil, and half a drachm of lard. The mixture should be smeared upon the affected part with the finger covered with a glove.

ACONITUM NAPELLUS (Polyandria Trigynia; Ranunculaceæ).

Description.—Aconite *leaves* are palmate and deeply divided, and they have been eaten by mistake for parsley. The *root* is long, small, and tapering, seldom thicker than a finger, and it has been eaten by mistake for parsnips and horse-radish, but is rather darker coloured externally.

Aconitum ferox. — This species of monkshood comes from the Himalayas; and is more powerful than the A. napellus. The root is thick, tap shaped, without rootlets, brown outside and white within. There are two kinds mixed together, which differ, probably, from difference of season when collected. One is dense and horny, and contains much starch; the other is light and friable, and has a chalky appearance. It contains nearly twice as much aconitina as the heavy root. Royle's Mat. Med., 2nd ed. p. 289.

Composition. — *Aconitina*, *aconitic acid*, and a *narcotic fatty oil*. There is also an *acrid matter*, which does *not* appear to possess *medicinal* properties. The acrid principle is soluble in alcohol, but very slightly so in water: hence the alcoholic is very acrid compared with the watery extract. The fatty oil and the aconitic acid are not used separately in medicine. The leaves should be gathered before the flowers appear; after which time they become more luxuriant, but rapidly lose their narcotic properties (*Christison*). The roots should be collected just before the leaves appear. It is generally stated that the leaves soon lose their virtue on being dried; but Christison says that this is a mistake, and that they will continue good for many years.

Medicinal properties.—*Anodyne; sedative; acrid; emetic; diaphoretic? diuretic; resolvent.* When the root or leaves are chewed, they sometimes, but not always, cause at first an acrid hot taste in the mouth; but this is quickly succeeded by numbness and tingling, which continue for some hours. The velum palati also appears as if elongated and fallen upon the root of the tongue, which induces the frequent attempts to swallow, noticed in most cases of poisoning by this drug. In repeated doses, aconite causes heat and tingling in the skin, which extend to the extremities. It lowers the frequency and force of the heart's action, and sometimes causes diuresis. It sometimes occasions exhilaration or symptoms of intoxication. When applied locally, it diminishes sensation, allays pain, and, if near the eye, causes *contraction* of the pupil; and, in a case mentioned by Mr. Curtiss of Camden Town, temporary loss of vision.[*] In *poisonous* doses, the symptoms, in three cases described by Pereira, and in one mentioned by Dr. A. Ramsay[†], correspond pretty closely. Vomiting or attempts to vomit; heat in the throat, and frequent attempts to swallow, the patients frequently putting their hands to their throat; *perfect consciousness* and *intelligence until just before death*; diminution of muscular power, but still ability to walk about until within a few minutes of death; disordered vision, and contracted pupil; generally, no convulsions. The pulse is only mentioned in one of these cases; it was extremely feeble and slow. How much was taken in these instances was not exactly known; but in the first three, the quantity of the root swallowed by each was probably not larger than the size of a filbert; in the last, the leaves were eaten, but the quantity was not known. In all, the symptoms commenced in about an hour after taking the poison, and death took place in from four to six hours. In a case mentioned by Dr. Golding Bird, two grains and a half of aconitina were swallowed; but the patient was not seen till eight hours afterwards. He had vomited freely, and his symptoms, when found, were "fearful collapse; surface cold and sweating; heart's action scarcely perceptible; pupils sensitive; no paralysis of either motion or feeling; perfect intelligence; terrific vomiting of a brownish fluid every two or three minutes, accompanied with sudden spasm of the diaphragm, and loud shouts. *Any attempt to make him swallow induced fearful spasm of the throat*, resembling hydrophobia, and entirely preventing the administration of remedies by the mouth. This was not excited by the mere sight of fluids; but the convulsive movements of the body and vomiting were produced by simply touching him abruptly." External warmth, mustard poultices to the epigastrium, and turpentine, and afterwards nutrient enemata with laudanum, were employed with success, and in about eighteen hours after being first seen he was convalescent. It was impossible to ascertain how soon the vomiting had followed after taking the aconitina.[‡]

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[*] Lancet, 1840-41, vol. ii. p. 474.

[†] North. Jour. Med., June, 1844, p. 120.

[‡] Lancet, Jan. 1st, 1848.

As cases of poisoning by the aconite itself are not common, the following are given to illustrate the general character of the effects produced.

Six plants of the Aconitum napellus, stalks and leaves, were boiled in half a pint of beer down to a quarter; and the patient drank half of it. In an hour he was quite insensible; pupils widely dilated; pulse scarcely perceptible; foaming at the mouth, and tossing his arms about. He died suddenly, very shortly afterwards. A cupful of neat brandy, administered as soon as he was seen, revived him for a short time before death. P. M., liver, spleen and kidneys distended with dark blood, veins generally congested.*

A man in good health ate part of a single root of Aconitum napellus by mistake for horse-radish. Soon afterwards he felt a peculiar tingling sensation in the arms and hands, which rapidly increased till he felt it "creeping round his neck." Thinking it owing to indigestion, he set off for a walk, but after walking some distance (not specified; but from his own house to his brother's), he sank into a chair, crying out that he was poisoned. Brandy was given to him, but he rapidly sank, and died in an hour afterwards.†

Post-mortem appearances.—Dr. Ramsay has published the examination of the case, which he saw. The most remarkable feature was the intense congestion of the brain and spinal marrow. Above a pound of blood escaped from the cranium during the examination. The blood was dark, and the heart empty. The lungs were healthy and *not* congested Deep inflammatory blush over the whole internal surface of the stomach.

Characteristic effects.—Local numbness and tingling. Vomiting; depression of the circulation and heart's power; and *continued intelligence*, and *voluntary muscular power until death; contracted* pupil, and excessive cerebral congestion. The absence of convulsions was at one time considered characteristic, but, in Dr. Bird's case, they were present with great severity.

Uses.—Pereira says that there is no remedy equal to it for the relief of *neuralgia*, when this is not dependent upon inflammation, and Mr. Curtis confirms this statement. Other practitioners have not found the same benefit from its employment. In *acute febrile rheumatism*, M. Lombard, of Geneva, has found it very serviceable. It first allays the pain, and then abates the fever. His dose was gr. ss to gr. viij of the extract, every two or three hours. Mr. Curtis has found f℥j to f℥ij of a tincture, locally applied, relieve severe rheumatic pains. When given internally, in rheumatism, it should be combined with a sudorific regimen. In the *nervous headache* of *anæmial people*, Dr. Burgess speaks very strongly of its value. He frequently premises its use by a few doses of aloes and myrrh pill.‡ It is used by homœopathists to relieve nervous headaches, and the feverishness of both infants and adults. It has been employed in *hypertrophy of the heart*, from its powerful sedative effects on the circulation, and as anodyne in *scirrhus*.

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* Sayle in Braith. Retrosp. vol. xiii. p. 168.

† Ass. Med. Jour., Nov. 25. 1853, p. 1040.

‡ Lancet, 1839-40, vol. i. p. 734.

Antidotes.—None is known.

Doses.—Of the extract, from gr. ¼ to gr. ij or more, every two to six hours. It should be used in the smaller doses to begin with. Of the tincture, ♏v, thrice daily. When this tincture or the extract is applied externally, it ought to be done by means of a small sponge and stick, so that it may not come in contact with the fingers. The extract may be applied like a plaster.

AQUA AMMONIÆ AND AQUA AMMONIÆ FORTIOR, *E.*

See Liquor Ammoniæ and Liquor Ammoniæ fortior, p. 155.

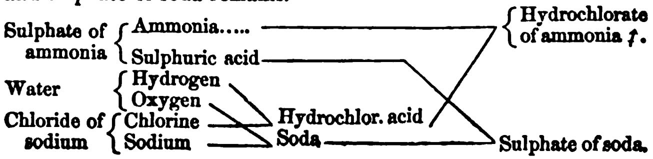
AMMONIÆ CARBONAS, *E.* See Ammon. Sesquicarbonas, p. 159.

AMMONIÆ HYDROCHLORAS, *L. D. E.*

Hydrochlorate or Chlorhydrate of Ammonia. (Am. HCl.)

Synonyme. Muriate of Ammonia, *D. E.* Chloride of Ammonium. Sal Ammoniac.

Preparation.—This article is placed in the Materia Medica, and therefore no directions are given for its preparation. It is a compound of hydrochloric acid and ammonia. Ammonia consists of nitrogen and hydrogen, and the source from which it is principally obtained is the decomposition of coal in making gas. Coal consists chiefly of carbon, with variable proportions of oxygen, hydrogen, nitrogen, and sulphur. Under the influence of the high temperature employed, the greater part of the hydrogen combines with the carbon, forming coal-gas, and part of the remaining hydrogen combines with the nitrogen, and forms ammonia. This is sublimed along with some carbonic or sulphuric acid, formed by the combination of the oxygen with the sulphur or carbon, and is condensed and collected in a cool place, constituting the "gas liquor;" which contains also water, and a variety of unimportant compounds. In order to obtain hydrochlorate of ammonia from this liquor, it is sometimes neutralised with sulphuric acid, and evaporated to dryness. The sulphate of ammonia thus formed is then mixed with chloride of sodium, and heat being applied, double decomposition ensues. Hydrochlorate of ammonia is sublimed, and sulphate of soda remains.



Sometimes the gas liquor is at once saturated with hydrochloric acid, and the impure brown crystals obtained by evaporating the solution are purified by sublimation from an iron pot lined with clay, and covered with a leaden head, in which the vapour is collected and condensed.

When bones or horns are exposed to a high temperature, as in making animal charcoal, a liquor is driven off which contains carbonate of ammonia (hence the name of spirit of hartshorn), the ammonia being derived from the combination of the hydrogen and nitrogen contained in animal matters. The hydrochlorate may be obtained from this liquor by the methods just described, or it may be procured by the addition of chloride of calcium; carbonate of lime is formed, which is precipitated, and hydrochlorate of ammonia remains in solution. When this is evaporated, impure crystals are obtained, which are purified by sublimation as before mentioned. If carbonic acid is substituted for sulphuric acid, and calcium for sodium in the above diagram, the decomposition which occurs will be readily seen.

Properties. — Hydrochlorate of ammonia is a colourless, semi-transparent solid, which is not crystalline, but has a fibrous appearance. It is tough, and not easily reduced to powder. It is totally sublimed by heat; and is soluble in about its own weight of boiling water, or in three times its weight of cold water. During its solution much cold is produced, and it is hence frequently employed in making cold lotions or freezing mixtures.

Composition. — Sal ammoniac consists of

1 eq. ammonia, 17; 1 eq. hydrochloric acid, 37; 1 eq. water, 9 $=\text{Am}, \text{HCl}, \text{HO}$; eq. 63.

There are several theories as to the arrangement of these constituents. Berzelius is of opinion that ammonia, NH^3, with one additional equivalent of hydrogen, constitutes a metal *Ammonium*, NH^4, which combines with the chlorine of the hydrochloric acid, and forms *chloride of ammonium*, NH^4,Cl, which thus agrees in constitution with other chlorides. Kane, however, does not adopt this theory, but considers ammonia to consist of a base which he terms *Amidogen*, NH^2, and 1 eq. of hydrogen, and he accordingly styles it *amidide of hydrogen*. When hydrochloric acid, or, in his language, chloride of hydrogen, is added, the resulting compound is called *chloro-amidide of hydrogen* NH^2,H,HCl.

These different modes of arrangement may be thus seen: —

Hydrochlorate of ammonia	- NH^3 (ammonia) $+HCl$.
Chloride of ammonium -	- NH^4 (ammonium) $+Cl$.
Chloro-amidide of hydrogen	- NH^2 (amidogen) $+H+HCl$.

If the acid which is combined with the ammonia is an oxy-acid, as the sulphuric, these hypothetical opinions can still be carried out. It is stated that there is no such thing as an anhydrous oxy-salt of ammonia, but that 1 eq. water is constantly present. The presence of this water is essential to the truth or consistency of Berzelius's hypothesis. According to him, the salt commonly called sulphate of ammonia, NH^3,SO^3,HO, is really sulphate of oxide of ammonium, NH^4,O,SO^3, the hydrogen of the water forming the metal ammonium with the ammonia, whilst the oxygen converts this into an oxide. On Kane's hypothesis, the water is not essential, but he regards this salt as sulphate of amidide of hydrogen, $NH^2,H,SO^3,+HO$.

Sulphate of ammonia - -	NH^3,SO^3,HO.
Sulphate of oxide of ammonium	NH^4,O,SO^3.
Sulphate of amidide of hydrogen	NH^2,H,SO^3,HO.

These views are, however, entirely hypothetical, as neither ammonium nor amidogen has been obtained in a separate state; but Rose seems to have established the truth of the statement, that all the oxy-salts of ammonia contain water, for he has proved that if anhydrous carbonic or phosphoric acid combines with anhydrous ammonia, the result is not carbonate or phosphate of ammonia, but a new substance in which neither the acid nor the base can be detected by tests. (*Annales de Chemie.*) The same has been proved of anhydrous sulphuric acid. (*Brande's Chemistry.*)

Tests and adulterations.—The only impurity to which it is liable is a small quantity of sulphate, which is quite unimportant, medicinally speaking.

Medicinal properties.—Alterative and resolvent.—"It slightly depresses the action of the heart and large arteries, but acts as an excitant to the venous and capillary systems; to the lymphatic vessels and glands; and to the skin, the kidneys, and the mucous membranes. It has the property of retarding or removing tumours, thickenings, and relaxations of these structures. It somewhat resembles mercury in this respect, but its continued use never occasions general cachexia, though it may injure the digestive powers."* It has long been supposed to have the power of promoting the removal of tumours, when applied externally. The bichloride of mercury is more soluble in a solution of this salt than it is in water alone.

Uses.—It is very little used internally in this country. Dr. Watson has found it very useful in doses of ʒss three or four times daily, in relieving what he terms *rheumatic neuralgia*, affecting the whole of the jaw. If it does not effect a cure in two days, he has not perceived any benefit from its continued use.† He writes thus: "In *hemicrania*, there is a kind of face-*ache* which cannot properly be called neuralgia, for it does not occur in short stubbing paroxysms, nor is the pain acute enough for tic douloureux, but which is very common, distressing, and frequently intractible. It is sometimes called rheumatic, occupies the jaw principally, and the patient cannot tell where it is most intense. Teeth are often fruitlessly extracted to cure it. I have again and again made use of muriate of ammonia, and been much thanked by my patients for the good I have done them. It should be given in ʒss doses three or four times a-day. It does not *always* succeed, but it *often* does. If the pain does not yield after four doses, you may cease to expect any benefit from it."

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* Sundelin, as quoted by Pereira, Mat. Med. 2d edit. p. 321.

† Prov. Med. Journ., Oct. 28. 1843, p. 75.

It is employed in *mild inflammatory fevers*, and in *inflammations of the mucous and serous membranes*, after the subsidence of the acute symptoms, but before the natural secretions and exhalations are restored. It is also used in *chronic inflammations* of the lungs, liver, and spleen, and in disease of the mysenteric or other glands. *Externally*, a solution is employed as a cold lotion, in *headache*, and *inflammatory affections of the brain, and in mania.* It is also applied to *bruises* to *prevent discoloration.* Dr. Addison highly commends the topical application of powdered sal-ammoniac, for the cure of *enlarged flabby uvula*, which, by falling upon the back of the pharynx, frequently causes obstinate coughing.

Doses. — From gr. v to gr. xxx, every two or three hours. For making a lotion, from ℥j to ℥ij are dissolved in f℥xij of water, and a few ounces of spirit may be added. Five parts of this salt, and five parts of saltpetre, whilst dissolving in sixteen parts of water, reduce the thermometer from 50° to 10° F. Such a mixture enclosed in a bladder has been recommended by Sir A. Cooper as an application to *strangulated hernias*, instead of the application of ice. It ought not to be made in large quantities at once, and it should be applied before the salts have had time to dissolve, as the cold is produced during the process of solution.

Officinal preparations.—Liquor Ammoniæ. Ammoniæ Sesquicarbonas. Ferri Ammon. Chlorid. Liquor Hydrargyri Bichlorid. Spiritus Ammoniæ. Spiritus Ammoniæ Aromaticus. Spiritus Ammoniæ Fœtidus.

AMMONIÆ LIQUOR, *L. D. E.*

SOLUTION OF AMMONIA.

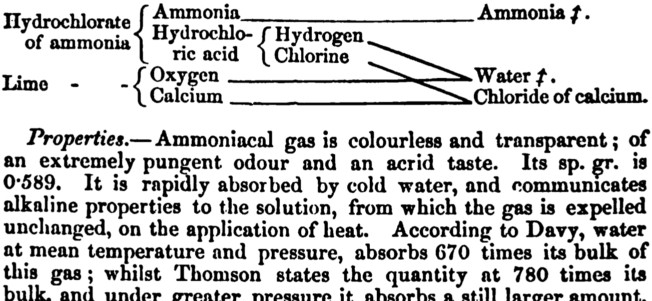
Synonyme. Aqua Ammoniæ, *E.* Spirit of Hartshorn.

AMMONIÆ LIQUOR FORTIOR, *L. D. E.* AQUA AMMONIA FORTIOR, *E.*

STRONGER SOLUTION OF AMMONIA.

Preparation.—Both the above solutions are prepared in the same manner, the only difference being in the quantity of water present.

Equal weights of hydrochlorate (muriate) of ammonia and recently slaked lime are taken and mixed together in a mortar. They are then introduced into a retort, which is connected with a Wolffe's apparatus (see *Illustration*, Acid. Hydrochl. p. 85.), the receivers being kept cold by cold water or ice. On applying heat to the mixed powders, the hydrochloric acid leaves the ammonia and combines with the lime to form muriate of lime, and the ammonia flies off, and is condensed by the water in the receivers. The process is continued until the materials are exhausted, and the strength of the solution is judged of by its specific gravity. If it is too high, more of the materials must be employed, so as to furnish an additional supply of ammonia. If it is too low, water is added to make it the proper density. During the distillation a small quantity of water passes over along with the gas, the origin of which is explained in the accompanying diagram, in which it is shown that chloride of calcium and water are formed, rather than muriate of lime, as above stated; the oxygen of the lime and the hydrogen of the acid uniting to form water, which is distilled, whilst the chlorine of the acid combines with the calcium of the lime, and forms chloride of calcium, which remains behind in the retort.



Properties.—Ammoniacal gas is colourless and transparent; of an extremely pungent odour and an acrid taste. Its sp. gr. is 0·589. It is rapidly absorbed by cold water, and communicates alkaline properties to the solution, from which the gas is expelled unchanged, on the application of heat. According to Davy, water at mean temperature and pressure, absorbs 670 times its bulk of this gas; whilst Thomson states the quantity at 780 times its bulk, and under greater pressure it absorbs a still larger amount. The volume of the water is much increased by the gas, and the solution has a lower sp. gr. than pure water. The sp. gr. diminishes in proportion to the quantity of gas present, and hence the stronger the solution, the lighter it becomes. If solution of ammonia and water are mixed in equal quantities, the sp. gr. of the mixture is exactly the mean of that of the ingredients. Solution of ammonia is a colourless liquid, having a pungent odour and an acrid taste; it combines with and neutralises acids, and changes vegetable yellows to brown, and blues to green. If exposed to the air the gas gradually escapes, and may be recognised by the white fumes formed on holding above it a rod dipped in hydrochloric acid.

Composition.—Ammoniacal gas consists of

[illegible] nitrogen, 14; 3 eqs. hydrogen, 3 = Am, or NH^3; eq. 17.

It is composed by volume, of

1 vol. N	Sp. Gra. 0·972	+	3 vols. H	Sp. Gra. 0·069	ditto	ditto
=	1·179 which condense into 2 vols Am.	Sp. Gra. 0·589	ditto			

For the hypothetical views of the nature of ammonia, see AMMONIÆ HYDROCHLORAS, *Composition*, p. 153.

Characters and tests.—*Liquor ammoniæ.*—Colourless. Sp. gr. ·960 (·950, *D.*); exposed to the air it goes off in very acrid alkaline fumes, which are evanescent, as shown by turmeric. Lime water being added, nothing is thrown down (nor does it effervesce on the addition of nitric acid, *E.*); it is not coloured by the transmission of hydrosulphuric acid; nor, when first saturated by nitric acid, does it throw down anything on the addition of sesquicarbonate of ammonia, nitrate of silver, or chloride of barium. Nearly 10 grains of ammonia are contained in 100 grains.

(1 cubic inch contains 132 cubic inches of gas, *Phillips.*)

Liquor ammoniæ fortior.—Sp. gr. ·882 (·900, *D.* ·880, *E.*). This solution may be reduced to the strength of liquor ammoniæ if two (two and a half, *E.*) ounces of distilled water are added to each ounce. Nearly 30 grains of ammonia are contained in 100 grains.

(1 cubic inch contains nearly 400 cubic inches of gas, *Phillips.*)

Neither of these solutions is liable to fraudulent adulteration, but they may be too weak from carelessness or from exposure to the air, which is provided against by the specific gravity, which is lower in proportion to the strength of the solution. If the lime used in the preparation has not been quite fresh, a little carbonate of ammonia would be formed, and then a white precipitate would fall on the addition of lime water, and it would effervesce with nitric acid. If the solution has been in contact with a copper vessel or pipe, it may have dissolved a little, which would be detected by the brown colour from hydrosulphuric acid. A little hydrochlorate or sulphate of ammonia or lime may have spirted over during the distillation, the first of which would give a precipitate with nitrate of silver, the second with chloride of barium, and the third with sesquicarbonate of ammonia.

Medicinal properties.—*Rubefacient*; *vesicant*; *caustic*; *stimulant*; *and antispasmodic.* Applied *externally*, the strong solution of ammonia produces heat and redness of the skin, and if long continued, inflammation, vesication, and the death of the part. The gas, when inhaled, produces violent irritation of the mucous membrane of the nose and mouth, and sometimes occasions extensive inflammation and ulceration, not only of this portion of the mucous membrane, but also of that lining the larynx and bronchial tubes. When it comes in contact with the conjunctiva, it causes a copious flow of tears; and applied to the nostrils, it sometimes quickly arouses persons who seem on the point of death from exhaustion or fainting. Its use in this way, however, requires caution, as serious inflammatory affections have been produced by employing it rashly and for too long a time.

When taken *internally* in *large doses*, it acts as a violent irritant or corrosive poison; but death has not often resulted from this cause. In *moderate* doses it excites warmth in the mouth and stomach, and quickens the circulation and respiration. At the same time it promotes the secretion of the skin, mucous membranes, and kidneys.

Characteristic effects.—Ammonia is a stimulant which quickly excites the heart's action, but the effect of which does not continue long. It does not appear to act upon the cerebral so much as upon the ganglionic system; for whilst it excites the secretions it does not affect the intellectual functions, or cause the pain in the head and subsequent oppression which follow the employment of many narcotics and of alcohol.

Uses.—In *atonic dyspepsia*, accompanied with great acidity. In the latter stages of *continued fever*, when a stimulant is desirable, but the condition of the patient contra-indicates the use of wine. In *pneumonia* and *bronchitis*, when depletion has been carried as far as is admissible, and the active symptoms have been subdued, but there is still oppression of the breathing, it is often of much use when combined with Senega. In *influenza*, almost from the commencement of the disease. In *spasmodic affections*, as *hysteria* and *epilepsy*, it is often swallowed, or the vapour inhaled, with much benefit, frequently preventing the occurrence of a threatened epileptic fit. As an *antidote* to *vegetable narcotic poisons*, and especially to poisoning by the oil of bitter almonds or hydrocyanic acid. In all these cases, however, except the last, the sesquicarbonate of ammonia is more frequently used than the simple aqueous solution.

Externally, as a *rubefacient*, it forms a frequent ingredient in embrocations for the relief of *rheumatism* or *neuralgic pains*. It is sometimes employed to raise a blister, for which purpose it has an advantage over a cantharides plaster in acting more speedily, and in not causing strangury. The strong solution has been successfully employed as a caustic by Mr. Bransby Cooper in performing the operation for the radical cure of old inguinal hernia. It is sometimes introduced as a caustic into the wounds produced by the bites or stings of venomous animals.

Antidote.—Weak vinegar or any dilute acid.

Incompatibles.—All acids and acidulous or neutral salts, and metallic salts; as it is neutralised by the first, and it precipitates the bases of the latter.

Officinal preparations.—Lin. Ammoniæ. Lin. Hydrarg. Hydrarg. Ammonio-chloridum.

Of *Liq. Ammon. Fort.*—Lin. Camph. co. Tinct. ammon. co.

Doses.—♏v to ♏xxx, properly diluted, and administered in milk or water, or any cold solution which is compatible with it.

AMMONIÆ BICARBONAS, *D.*

BICARBONATE OF AMMONIA.

Take of commercial sesquicarbonate of ammonia any convenient quantity.

Reduce it to a fine powder, and having spread it on a sheet of paper, expose it to the air for twenty-four hours. Let it be now enclosed in a well-stopped bottle.

Remarks.—On exposure to the air, sesquicarbonate of ammonia loses part of its ammonia, and is converted into bicarbonate.

Medicinal properties, uses, and doses.—Same as those of Sesquicarb. Ammon., except that it is less pungent and stimulating.

AMMONIÆ SESQUICARBONAS, *L. D. E.*

SESQUICARBONATE OF AMMONIA.

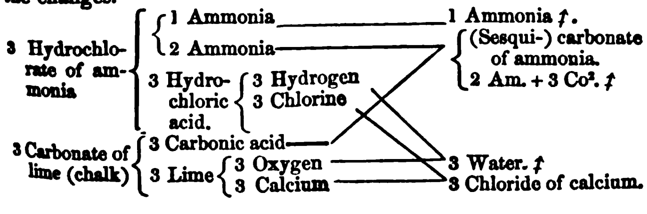
Synonyme. Ammoniæ Carbonas, *E.* Ammoniæ Subcarbonas.

This preparation is now placed in the Materia Medica, and no directions being given in the Ph. Lond. for its formation, the following are taken from the Ph. Ed.

Take of Hydrochlorate of ammonia, a pound;
Chalk, a pound and a half.

Rub them separately to fine powder; mix them thoroughly, and subject the mixture in a retort with a proper receiver, to a gradually increasing heat, so long as any vapours sublime, *E.*

Process and decomposition.—The reaction in this case is more complicated than in the formation of Liq. ammoniæ. Instead of lime, carbonate of lime is employed, and the product is consequently a carbonate of ammonia. The following diagram indicates the changes.



Composition.—The salt which is thus sublimed consists of

1 eq. ammonia, 17; 1½ eq. carbonic acid, 33; 1 eq. water, 9 $= Am, 1\frac{1}{2}\ CO^2,HO$; eq. 59.

It has therefore the proportions necessary for forming a hydrated sesquicarbonate of ammonia, $Am,\ 1\frac{1}{2}\ CO^2,HO$; and this is its real constitution, according to Mr. Phillips.* According to Dalton, however, it is not a true sesquicarbonate, but a compound of anhydrous carbonate, $Am,\ CO^2$, and bihydrated bicarbonate of ammonia, $Am,\ 2\ CO^2,2HO$.

Phillips,	2 eqs. hydrated sesquicarbonate of ammonia	$2Am,3CO^2,2HO$
Dalton,	Anhydrous carbonate of ammonia	$Am,\ CO^2$
	Bihydrated bicarbonate of ammonia	$Am,2CO^2,2HO$

Both the hydrochlorate of ammonia, and the chalk from which it is prepared, are neutral compounds, and this salt ought therefore to be neutral also. In the beginning of the process, however, 1 eq. of ammonia (from 3 eq. of hydrochlorate) and 1 eq. of water escape uncombined with carbonic acid; and the result is, therefore, this compound of 2 eqs. of ammonia with 3 eqs. of carbonic acid.

Properties.—Pure sesquicarbonate of ammonia is a hard, colourless, translucent salt, which has a fibrous, not crystalline structure, and possesses a very pungent odour. It is entirely sublimed by heat; but during the sublimation its constitution is changed by losing part of its carbonic acid. If exposed to the air it evolves ammonia, becomes opaque, pulverulent, much less pungent, and is converted into bicarbonate of ammonia. It is entirely soluble in about four times its weight of cold water; but boiling water decomposes it, with the evolution of carbonic acid. In this respect it resembles the bicarbonate of potash, and the bicarbonate of soda. Its solution changes turmeric paper brown. This substance is sometimes kept in the form of powder, for the sake of convenience, in which case it is almost certainly converted into the bicarbonate.

Characters and tests.—Colourless; semitransparent; it has an acrid taste and smell; it changes the colour of turmeric to brown; it is dissipated by heat. It is dissolved by water. When nitric acid is added in excess, nothing is thrown down by chloride of barium or nitrate of silver.

There is no probability of fraudulent adulteration. If exposed to the air it loses its translucency and falls to powder. If the whole of the muriate or sulphate of ammonia has not been decomposed by the chalk, a little may have sublimed along with the sesquicarbonate, and would be shown by the nitrate of silver, and the chloride of barium.

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* Translation of Pharmacopœia, 1836.

Medicinal properties.—They resemble those of liquor ammoniæ, except in being less active (in consequence of its combination with carbonic acid), but rather more permanent. It is a more powerful diaphoretic than the simple solution of ammonia. In doses of ʒss or more, it is liable to cause vomiting. It has little energy as a local application.

Uses.—It is much more frequently used internally than the liquor ammoniæ, as being more manageable and less irritating; and is employed in the various diseases mentioned in the description of that preparation. Dr. Barlow has employed it in some cases of *diabetes*, with benefit[*]; but it has not been equally successful in the hands of Dr. Pereira.[†] In its solid form it is very commonly used as a *smelling salt*, combined with some aromatic, to relieve hysteria, syncope, or sickness. As an *emetic* it has been administered where it was desirable to avoid causing depression, as in weak old people. It frequently enters as an ingredient into *effervescing draughts*.

It is sometimes added to dough before being baked, in order to make the bread light; and is occasionally used in liniments as a rubefacient in chronic rheumatism.

℈j of this salt is neutralised by fʒvi of lemon juice, or gr. xxiv of citric acid.

Incompatibles.—Acids; and acidulous, neutral or metallic salts, except sulphate of magnesia.

Officinal preparations.—Liquor Ammoniæ Sesquicarb. Liquor Ammoniæ Acetatis. Cupri Ammon. Sulphat. Liniment. Ammon. Sesquicarb.

Carbonate of ammonia, though not ordered as such, is formed in making Sp. Ammon. Aromat. and the Sp. Ammon. Fœtid.

Dose.—As a diaphoretic or stimulant, gr. ij to gr. v or gr. x, in pill or solution. As an emetic ʒss, properly diluted, and repeated if necessary.

LIQUOR AMMONIÆ SESQUICARBONATIS, *L. E.*

SOLUTION OF SESQUICARBONATE OF AMMONIA.

Synonyme. Aqua Ammoniæ Carbonatis, *E.* Liquor Ammoniæ Subcarbonatis.

Take of Sesquicarbonate of ammonia, four ounces;
Distilled water, a pint.
Dissolve and strain.

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[*] Guy's Hosp. Reports, vol. v.

[†] Mat. Med. 2d edit. p. 310.

Remarks. — It is not easy to make this solution perfectly clear; and at Guy's Hospital they have been in the habit of dissolving the salt and then distilling the solution as long as it continues to come over clear. The sesquicarbonate is volatile at 212° when dissolved in water, but at the same time it loses some of its carbonic acid. It ought not to be made in large quantities at a time, as it loses its pungency if frequently exposed to the air.

Dose. — ♏x to f℥j; in any bland vehicle. Five minims contain one grain.

Incompatibles. — See Ammoniæ Sesquicarbonas, p. 161.

Officinal preparation. — Lin. Ammon. Sesquicarb.

LIQUOR AMMONIÆ ACETATIS, *L. D. E.*

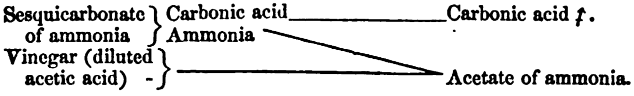
Solution of Acetate of Ammonia.

Synonyme. Spiritus Mindereri. Aqua Ammoniæ Acetatis, *E.*

Take of Sesquicarbonate of ammonia, nine drachms, or as much as may be sufficient.
Dilute acetic acid (French distilled vinegar, (*E.*, a pint.

Add the sesquicarbonate to the acid, to saturation.

Process. — The (distilled vinegar, *E.*) dilute acetic acid in this case displaces the carbonic acid with which the ammonia was combined, and forms acetate of ammonia which remains in solution whilst the carbonic acid flies off as a gas.



The exact proportions of sesquicarbonate of ammonia and acid or vinegar are not prescribed by the Pharmacopœia, because each is liable to vary in strength. If the ammoniacal salt has been exposed to the air, and has become opaque and partly converted into bicarbonate of ammonia, the quantity of alkali in a given weight is diminished, and hence more must be used. Some practitioners prefer having a slight excess of acid, as the solution is then rather more febrifuge; whilst others, who regard this medicine as a stimulant diaphoretic, prefer an excess of ammonia, as being more stimulant, and better adapted for the later stages of fever, in which a medicine of this class may be required. Any excess of ammonia will, however, be injurious when this solution is employed as a collyrium, for which purpose it is frequently used.

Characters and tests. — Without colour or smell. Sp. gr. 1·022 (1·011, *E.*). It does not change the colour or turmeric or litmus. Hydrosulphuric acid being added it is not coloured, nor is anything thrown down on the addition of chloride of barium. What is thrown down by nitrate of silver is dissolved by water, and especially by nitric acid. It emits ammonia on the addition of potash, and acetic acid vapours on the addition of sulphuric acid. The liquid being evaporated, what remains is dissipated by heat.

These tests are needlessly minute; they prove the absence of excess of either ammonia or acetic acid, which is well enough; the absence of any metallic impurity in the distilled vinegar, which is quite unlikely; and of any small quantity of sulphuric or hydrochloric acid, which is perfectly immaterial. The latter characters show the nature of the solution.

Incompatibles. — Some carbonic acid generally remains diffused through the solution, and this causes a white precipitate of carbonate of lead, on the addition of acetate or diacetate of lead. If there is any excess of sesquicarbonate of ammonia, the precipitate will be more considerable.

Medicinal properties. — This solution is regarded as *refrigerant* in small doses; and as *diaphoretic* in large ones. It is, however, frequently taken in considerable quantities without any obvious effect. If there is any *excess of ammonia* present, it is *stimulant* and *diaphoretic*, and if given in considerable doses, not unfrequently *causes nausea, if not actual vomiting, in patients labouring under fever.*

Uses. — In *fever*, *catarrh*, and *influenza*, it is constantly employed, alone or in combination with antimony or other salines. It may be combined also with opium if necessary, and the mixture then acts more decidedly upon the skin. In *painful menstruation*, it is sometimes employed.

Topically, it is used as a collyrium in chronic *ophthalmia*, and the addition of a small proportion of opium and camphor mixture is good. As a discutient in *bruises* and *sprains*. Dr. Thomson has used it with decided benefit as a lotion in some cases of *porrigo* of the scalp.

Dose fʒiii to f℥j. "Many physicians err in prescribing it in too small doses." (*Christison.*)

LIQUOR AMMONIÆ CITRATIS, *L.*

SOLUTION OF CITRATE OF AMMONIA.

Take of Citric acid, three ounces;
Distilled water, a pint;
Sesquicarbonate of ammonia, two ounces and a half, or as much as may be sufficient.

Dissolve the acid in the water, and add the sesquicarbonate to saturation.

Medicinal properties and uses. — Same as those of Liquor Ammoniæ Acetatis, but not quite so sickly.

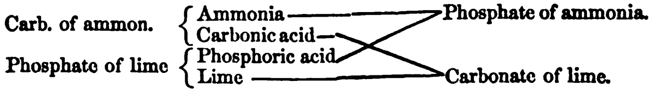
Dose.—f ʒj to f ʒiij.

AMMONIÆ PHOSPHAS. (Not Off.)

PHOSPHATE OF AMMONIA.

Preparation. — This salt is prepared by adding carbonate of ammonia to the acid phosphate of lime obtained during the early stages of the manufacture of phosphorus (see p. 105.). Double decomposition ensues, the ammonia combining with the phosphoric acid, and forming phosphate of ammonia, which remains in solution, whilst the carbonic acid combines with the lime and forms carbonate of lime, which is precipitated.

In the following diagram the ingredients only are represented, the number of equivalents employed being disregarded.



The solution of phosphate of ammonia is then evaporated, and the salt is obtained in a crystalline form. Care must be taken to have a slight excess of ammonia.

Properties.—Phosphate of ammonia is in small colourless crystals, the form of which is not so marked as to give them any striking character. It is soluble in 4 parts of cold water. When heated to redness, the ammonia is driven off, and hydrated phosphoric acid remains behind. When long exposed to the air, even without heat, the crystals effloresce and lose part of their ammonia, and biphosphate of ammonia is the result.

Medicinal properties. — Phosphate of ammonia has a cooling, saline, bitterish taste, but does not exert any strongly marked influence upon the secretions or excretions. It has, however, been brought into notice for the treatment of *Gout* and *Rheumatism* by Dr. Buckler of Baltimore, and occasional notices of its employment in this country have appeared in the medical journals. It has not hitherto been sufficiently tried to test its powers unequivocally, and as it has generally been used along with colchicum or other remedies in the treatment of these diseases, the effects which have been produced are open to much uncertainty. Upon the whole, the testimony hitherto is not strongly in its favour, but it perhaps deserves a further trial.

Dose. —Gr. x to ℈ij dissolved in water three or four times a day.

ATROPIÆ SULPHAS, *L.*

Synonyme. Sulphate of Atropia, or of Atropina.

Take of Atropia, seven scruples and a half, or as much as may be sufficient.
Dilute sulphuric acid, two fluid drachms.
Distilled water, half a fluid ounce.

Add the atropia by degrees to the acid mixed with the water, till it is saturated. Let the solution be strained, and evaporated with a gentle heat until crystals are formed.

We only design this salt for external use.

ATROPIA.

Description and preparation. — The basis of this preparation is not manufactured in this country, but is obtained from Germany. It is obtained from the leaves or dried root of the Atropa belladonna, by a very complicated series of solutions in spirit, filtrations, acidulations, evaporations, neutralisations by carbonate of potash, and final crystallisations; after which trouble, Messrs. Smith of Edinburgh obtained 16 grains from 32 ℔. of leaves; and Mein, 20 grains from 12 oz. of the root (*Christison*).

Properties and uses. — Sulphate of atropia is a colourless salt, easily soluble in water, especially on the addition of two or three drops of dilute sulphuric or hydrochloric acid. It is only employed for dilating the pupil, for which purpose it answers better than belladonna, in that it is less liable to produce irritation of the eye. It acts in much smaller quantity, is cleaner, and equally efficacious. It should be applied from two to four hours before its full effect is required; but it produces considerable dilatation in 15 or 20 minutes.

In some rare instances it produces erysipelas of the face. Three patients have been mentioned to me by Mr. Neill in whom this effect was always produced by the application of atropia to the eye, whilst the employment of belladonna was not followed by any such consequences. When there is much irritability of the eye it is sometimes necessary to remove this state before atropia will dilate the pupil; and he has observed cases in which the repeated application of this substance has produced no effect upon the pupil in rheumatic iritis unaccompanied by the deposition of lymph, until the eye had been soothed by the vapour of prussic acid (see p. 94), after which the atropia dilated it to a full extent.

A solution of 2 grains to an ounce of distilled water, and two or three drops of hydrochloric acid, forms a convenient strength. One or two drops placed upon the conjunctiva by means of a camel-hair pencil answer the purpose.

Characters and tests of Atropia.—White; it has a prismatic form, and is dissolved by water and rectified spirit. No certain tests are yet known which prove its purity.

BEBEERINÆ SULPHAS. (Not Off. in any Ph.)

SULPHATE OF BEBEERINE.

NECTANDRA RODIÆI (Dodecandria Monogynia; Lauraceæ).

History. — This alkaloid, which is not yet introduced into any of the Pharmacopœias, was brought before the notice of the profession by Dr. Rodie, of Demerara, as a substitute for quinine, in the treatment of periodic diseases; and although in the hands of some persons it has not equalled his reports of its merits, the amount of testimony in its favour is so great as to place it in an increasingly prominent position as a tonic and antiperiodic.*

The tree which yields it is a species of laurel, the wood of which is hard, and of an olive green colour; but it is the bark which contains the bebeerine, and another alkaloid termed *sepeerine*, about which, however, some slight doubt still exists; its discoverer, Dr. Maclagan, having expressed a doubt whether it is anything but an oxide of bebeerine.†

The bark is in pieces, one or two feet long, several inches broad, and about half an inch thick. Its colour is brown. It has no smell, but is intensely bitter. It contains about 1·5 per cent. of bebeerine (*Christison*).

Preparation of sulphate of bebeerine. — This is the only salt at present employed in medicine, and it is obtained from the bark, and also from the seeds, by a process nearly similar to that of the Ph. Ed. for procuring sulphate of quinine. The bark is first boiled with carbonate of soda, which removes the tannin and colouring matter, and is then repeatedly boiled in very dilute sulphuric acid, which dissolves the bebeerine, forming an impure sulphate, which is purified by precipitation by means of carbonate of soda, re-solution in weak sulphuric acid, and digestion with animal charcoal, after which the solution is carefully evaporated to dryness.‡

Characters and tests. — Sulphate of bebeerine is not crystalline, nor are any of the salts of this alkaloid. It is in minute yellowish scales, which admit of being powdered. It is soluble in water if a few drops of sulphuric acid are added. The necessity for this addition arises from the fact that the salt is liable to be decomposed and converted into carbon whilst drying, if it is in the state of a neutral sulphate. It is therefore always made with a slight deficiency of sulphuric acid. It is entirely consumed by heat when exposed to the air at the same time, which furnishes a test for the only probable adulteration — viz. sulphate of lime, which does not disappear when heated upon platinum foil.

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* Ed. Med. and Surg. Journ. 1845-7-9.

† Ed. Journ. *ut supra*, 1845,

‡ Christison, Dispens. 1848.

Composition. — Sulphate of bebeerine is what is termed a "basic" salt, *i. e.* the base is in excess, as it does not contain quite sufficient acid to form a neutral sulphate. 100 parts consist of

Bebeerine, 90·83; sulphuric acid, 9·17 (*Maclagan*).

Bebeerine itself is a pale yellow resinous-looking substance, which is very soluble in alcohol, less so in ether, and scarcely soluble in water. It is obtained by adding ammonia to the sulphate, when the sulphuric acid, combining with the ammonia, sets the bebeerine free. "It is remarkable, that the atomic composition of this alkaloid is the same as that of morphia, $C^{35}, H^{40}, N^{2}, O^{6}$, although the two substances differ so essentially in their appearance and properties, from which it is probable that the medicinal effects of organic compounds depend as much, or more, upon the manner in which their elements are combined, as upon the simple number of their equivalents." (*Maclagan and Tilley, Ph. Journ.* 1845-6.)

The atomic constitution as given by these chemists does not, however, correspond with that of morphia by Liebig and Regnault.

Bebeerine, $C^{25},H^{40},O^{6},N^{2}$. Morphia, $C^{30},H^{18},O^{6},N^{1}$ (*Liebig*).
$C^{35},H^{20},O^{6},N^{1}$ (*Regnault*).

Medicinal properties and uses. — *Antiperiodic; tonic; stomachic.* The testimony of many persons has proved it to be a powerful and valuable antiperiodic and febrifuge in *intermittent* and *remittent fever*, and it has also been used with good results in *periodic headache*, *neuralgia*, and *tic douloureux.* In this country it has been chiefly employed in these latter cases, and as a general tonic in *dyspepsia*, *anæmia*, and especially in *strumous ophthalmia* and other scrofulous affections; and there is a daily increasing confidence in its powers. Its taste is intensely bitter.

Characteristics as an antiperiodic. — It is not so speedy in its effects as quinine, nor quite so powerful. It is less liable to cause headache and ringing in the ears, and does not produce the depression of pulse and cold sweat which an extreme dose of quinine sometimes does. It does not disorder the digestive organs, and hence it can be taken in some cases when the stomach will not bear quinine.

Dose and administration. — It may be given either in pills made up with confection of roses or some soft extract, or in solution, a few drops of dilute sulphuric acid being added to render it perfectly soluble. As a general tonic it may be given in doses of gr. j to gr. iij. In the treatment of ague in the East and West Indies, it has been given in doses of gr. viij to gr. xij, or ℈j, three or four times daily, until the cure is effected.

MORPHIA, *D.*

This is officinal in the Dublin Ph. only, and is prepared by adding solution of ammonia, in excess, to a solution of hydrochlorate of morphia, washing the precipitate with cold distilled water, and drying it with a gentle heat.

In this process, the ammonia simply combines with the hydrochloric acid, and the morphia is set free.

Properties. — Morphia, as thus obtained, has no regular crystalline figure; but when dissolved in boiling alcohol it forms transparent, colourless, six-sided crystals, as the solution cools. They are almost insoluble in cold water, to which, however, they communicate an intensely bitter taste; but are soluble in about 100 parts of boiling water, or in thirty parts of boiling alcohol, from which the morphia crystallises on cooling; they are scarcely soluble in ether. They are dissolved by the fixed and volatile oils, and by most acids, readily; and are also slightly soluble in solution of potash, soda, or ammonia. The alcoholic solution is alkaline to test paper. When heated, they first fuse, and are ultimately decomposed, leaving a portion of charcoal. Carbonate of ammonia is one of the products of their decomposition.

Tests and adulteration. — Morphia is not liable to wilful adulteration; but it may be slightly coloured from imperfect preparation. For its characters, see MORPH. ACETAS, p. 169.

Composition. — Morphia consists of

Carbon, 35 eqs. 210; hydrogen, 20 eqs. 20; oxygen, 6 eqs. 48; nitrogen, 1 eq. 14 = Mor, or C^{35},H^{20},O^{6},N; eq. 292.

The nitrogen in its composition is the source of the ammonia evolved during its decomposition.

The crystallised morphia consists of

1 eq. morphia 292; 2 eqs. water, 18; = Mor, 2 HO; eq. 310.

Medicinal properties and uses. — Morphia is scarcely ever used in medicine, and it is doubtful whether, as morphia, it possesses medicinal properties, owing to its insolubility; but it is readily dissolved by the juices of the stomach, and the compound thus formed is an active medicine and poison. It is only employed medicinally for forming the acetate; but it is sometimes used by chemists as a test for nitric acid, though it possesses no advantages over brucia, which is much more delicate. For the medicinal properties of the salts of morphia, see the INDEX.

Officinal preparations. — Morphiæ Acetas. Liquor Morph. Acet. (gr. j in f℥j, *L.*; gr. j in f℥ij, *D.*) Morphiæ Hydrochloras vel Murias. Liq. (vel Sol.) Morph. Hydrochl. vel Muriatis (gr. j in f℥j. *L.*; gr. j in f℥ij. *D. E.*).

Trochisci Morphiæ, *E.* (gr. $\frac{1}{40}$ in each). Troch. Morph. et Ipecac. *E.* (gr. $\frac{1}{40}$ in each).

MORPHIÆ ACETAS, *L. D. E.*

ACETATE OF MORPHIA.

This is now placed in the Materia Medica by the London College, and no directions are given for preparing it. It is made by dissolving morphia (freshly precipitated from the muriate by ammonia) in acetic acid, evaporating the solution nearly to dryness, and setting it aside for a few days, that the acetate may crystallise.

Preparation. — This is a case of simple solution, in which the morphia is dissolved by the acetic acid. During the evaporation part of the acid is sometimes dissipated, and the remaining salt contains, therefore, a little uncombined morphia, which requires an addition of acetic acid for its solution.

Properties. — Acetate of morphia is very seldom crystalline, but is generally in the state of powder. It has a slightly yellow tinge, and is very soluble in water, unless, as above mentioned, it has been partially decomposed in the preparation; but is not so soluble in alcohol. It is decomposed by the strong alkalies, the morphia being precipitated. At a high temperature, it is decomposed and dissipated, either entirely, or with a slight residuum of carbon.

Characters and tests.—It is dissolved by water and by rectified spirit, and forms crystals when the spirit is distilled, which perish in the fire. Nitric acid being added, it first becomes red, and then yellow. Tincture of sesquichloride of iron induces a blue colour. Freshly prepared chlorine being first added, and afterwards ammonia, a brown colour arises, which disappears when more chlorine is added. Morphia is thrown down by solution of potash, by which it is again dissolved if added in excess.

All the above tests are characteristic of morphia. No test is given for its purity or for the presence of the acetic acid.

" 1000 measures of a solution of gr. x in f℥ss of water, and ♏v of acetic acid, heated near to 212°, and decomposed by a faint excess of ammonia, yield, by agitation, a precipitate which in 24 hours occupies 15·5 measures of the liquid." (*E.*)

The above supplies a test of the quantity of morphia present, and so of its freedom from adulteration. The precipitate is morphia, which, if in proper quantity, occupies the space above mentioned.

Composition. — Acetate of morphia consists essentially of

1 eq. morphia, 292; 1 eq. acetic acid, 51; 1 eq. water, 9
$= \text{Mor}, \bar{A}, HO$; eq. 352.

but as it is liable to be decomposed during the evaporation, its composition is not constant.

Medicinal properties and uses. — I shall here only mention those in which it differs from the hydrochlorate, over which it is acknowledged on all hands that it possesses no advantages. On the contrary, it is less certain in its composition, and is more liable to change after being made. Dr. Macrorie has observed that it causes more sweating than the hydrochlorate, which remark is confirmed by Dr. A. T. Thompson. Its uses are precisely similar to those of the hydrochlorate.

Dose and administration. — Gr. ⅛ to gr. j, which is equal to about twice or three times the same quantity of opium.

LIQUOR MORPHIÆ ACETATIS, *L. D.*

SOLUTION OF ACETATE OF MORPHIA.

Take of Acetate of morphia, four drachms (gr. lxxxii, *D.*).
Acetic acid, fifteen minims.
Distilled water, a pint (f ℥xv, *D.*).
Proof (rectified, *D.*) spirit, half a pint (f ℥v, *D.*).
Mix, and dissolve.

This solution contains one grain of acetate of morphia in one fluid drachm. The Dublin solution is just half this strength.

Dose. — ♏viii (gr. ⅛) to f ʒj (gr. j), or twice the dose, if the Dublin solution is ordered.

MORPHIÆ HYDROCHLORAS, *L. D. E.* (MURIAS, *D. E.*)

HYDROCHLORATE (MURIATE, *D. E.*) OF MORPHIA.

This is placed in the Materia Medica by the London College, which does not give any directions for its preparation.

It is prepared by macerating opium in repeated small quantities of water, until nothing further is dissolved, as shown by the absence of colour or taste. The solutions, when mixed together, are evaporated to a small quantity, and then mixed with muriate of lime in solution. A precipitate falls, and the supernatant liquid (which contains all the morphia) is to be poured off and evaporated till crystals form on cooling. They are at first very impure, and are to be purified by repeated solution in water, filtration through animal charcoal, and crystallisation.

Explanation. — The morphia exists in opium combined with meconic acid and various other ingredients, to be mentioned hereafter. This meconate of morphia is dissolved, along with gum and colouring matter, by the water. When evaporated and mixed with solution of muriate of lime, the meconic acid combines with the lime and forms an insoluble meconate, which carries down with it much of the gum and colouring matter, leaving an impure and still coloured muriate of morphia in solution, the morphia having combined with the muriatic (hydrochloric) acid set free from the lime. By repeated filtration through animal charcoal, evaporations, and re-solutions, the whole of the colouring matter and other impurities are at length removed, and the pure salt is obtained in a crystalline form.

Characters and tests.—It is dissolved by water and rectified spirit. What is thrown down by nitrate of silver is not dissolved by hydrochloric, nor by nitric acid, nor by ammonia, unless added in excess. In other respects it corresponds with acetate of morphia.

"Loss of weight at 212°, not above 13 per cent.: 100 measures of a solution of 10 grains in f℥ss of water, heated near to 212° and decomposed with agitation by a faint excess of ammonia, yield a precipitate which in twenty-four hours occupies 12·5 measures of the liquid." (*E.*)

The London tests merely characterise the hydrochloric acid, and so distinguish it from the acetate. The Edinburgh tests show the presence of the proper quantity of morphia. The loss on heating is owing to the escape of water of crystallisation. The precipitate is less in this case than in that of the acetate, because there is rather less morphia in 100 grains of the muriate than in an equal weight of the acetate.

Remarks.—Hydrochlorate of morphia is obtained from opium, the chemical, physical, and medicinal properties of which are fully described under the article TINCTURA OPII.

LIQUOR (SOLUTIO, *E.*) MORPHIÆ HYDROCHLORATIS, *L. D. E.* (MURIATIS, *D. E.*)

SOLUTION OF HYDROCHLORATE (MURIATE, *D. E.*) OF MORPHIA.

Take of Hydrochlorate of morphia, four drachms.
Distilled water, a pint.
Proof spirit, half a pint.
Mix, and dissolve.

D. E. Muriate of morphia, ʒjss; distilled water, f℥xv; rectified spirit, f℥v.

The London solution contains one grain of muriate of morphia in one fluid drachm. The Dublin and Edinburgh solutions are just half this strength, and contain one grain in two drachms.

Dose. — ♏viii (gr.⅛) to fʒj (gr. i.); or of the Dublin and Edinburgh solutions twice the dose.

PHYLLERINÆ SULPHAS. (Not Off.)

SULPHATE OF PHYLLERINE.

(I have not been able to obtain any of this drug, nor to learn in what manner it is prepared.)

This substance is reported by Dr. Sachelli to have proved very efficacious as a febrifuge in ague, in doses of gr. xii to gr. xv. (*Rank. Abs.* vol. ix. p. 264.)

I have introduced this substance, not so much for its own sake (for it has not yet been sufficiently tested to prove its merits), as for the purpose of drawing attention to the medicinal properties of the natural order of plants to which the phillyrea belongs — viz. the Oleaceæ or olive-worts. In the present day, when emigration is so extensive, and new regions of the world are daily acquiring inhabitants, the febrifuge powers of this order ought not to be passed over in silence. The common lilac (Syringa vulgaris) and the common ash (Fraxinus excelsior), as well as the olive tree (Olea Europæa) all belong to this order; and the barks of all, as well as that of the phillyrea, agree in possessing decided febrifugal powers. "In that part of Berri called Brenne, which is marshy and insalubrious to the last degree, the peasants employ no other remedy for the ague prevalent there but the bark of the lilac. And the bark of the olive tree has also, according to De Candolle, a high reputation as a substitute for cinchona." (Lind. *Veg. King.* p. 617.)

Mr. Maltass, of Smyrna, says, "In 1843 I was in Mytelene, when fever and ague of the worst description were raging, and I could procure no quinine. I thought of *olive-leaves*, and commenced administering doses of a decoction of the leaves, say two handfuls boiled in a quart of water down to a pint. Dose, a wineglassful every three or four hours. Obstinate cases of fever gave way before it, and for many years I have found it more effectual than quinine. I have recommended it to our medical men, and though at first they ridiculed it, they all use it now." (*Ph. Jour.* Feb. 1854, p. 353.) To this Mr. Hanbury (same page) adds that the French surgeons frequently used them during the Peninsular war, as a substitute for cinchona. Both the leaves and *young* bark of the olive have been analysed by Pallas, who found a crystallisable principle, which he named *Vauqueline*, and a bitter one. The young bark (which contains more than the old) yielded him nearly 2 per cent. of vauqueline. This alkaloid is said to have a slightly sweet taste, and is soluble in water at all temperatures. It is scarcely soluble in cold alcohol. (Hanbury, *Ph. Jour. ut supra.*)

From this property it would appear that a decoction or extract is likely to be a better preparation than a tincture. The extract might be given in doses of half a drachm, increased according to circumstances.

PIPERINE. (Not Off.)

This substance, which is obtained from *black* or *white pepper*, is so feebly alkaline, as to be sometimes described as neutral.

Mode of obtaining it.—Digest white pepper for three days in alcohol, sp. gr. ·833. Evaporate the solution; treat the residuary extract by solution of potash, which dissolves the resin, but leaves the piperine in an impure state. Wash this with cold water, in which it is insoluble, then dissolve it in alcohol, evaporate and crystallise.

Characters and tests.—Pure piperine is colourless, but it generally has a pale yellow tint. It is insoluble in cold water, very slightly soluble in hot; soluble in alcohol, and slightly so in ether. Sulphuric acid makes it blood red, and nitric acid also makes it red.

Composition.—C^{34}, H^{19}, O^{6}, N.

Medicinal properties and uses.—It is said to be a powerful anti-periodic, and to have proved very useful in *ague*. In this country it has not been used in this disease; but if the supply of quinine should fail, it might prove a useful substitute.

Dose.—Gr. vi to gr. viii, every 2 or 3 hours until ℈ij to ℈iij have been taken. It is given in the form of pills.

QUINÆ DISULPHAS, *L.* (SULPHAS, *D. E.*)

Disulphate (Sulphate) of Quinine.

Preparation.—This substance is now placed in the Materia Medica by the London College; and no directions are given for its preparation. It is obtained in the largest quantity from yellow bark, though it exists also, but in smaller quantity, in red bark, and in smaller quantity still, in pale bark. Both the Dublin and Edinburgh Pharmacopœias contain directions for making it, but they differ considerably in the methods prescribed.

Dub.—The directions here are, to boil the yellow bark repeatedly with water acidulated with a small quantity (f℥j) of sulphuric acid, by which means an acid solution of kinate of quina is obtained, and the woody matters are left behind. To this solution, slacked lime is added in excess, which throws down both the sulphuric and the kinic acids in the form of sulphate and kinate of lime; and the quinine, deprived of its acid, is also precipitated. The precipitate, after being pressed nearly dry, is boiled in spirit, which dissolves the quina, but leaves the salts of lime behind. The spirit is then distilled off, and dilute sulphuric acid is added in slight excess. The solution of sulphate of quina thus formed is boiled with animal charcoal, to separate the remaining colour, filtered, and then evaporated until crystals form on cooling.

Ed.—The Edinburgh College directs the yellow bark to be first boiled in a solution of carbonate of soda, by which the colouring matter and resin of the bark, some extractive, and the kinic acid, are removed, whilst the quina is left behind in an insoluble form. It is then to be boiled with dilute sulphuric acid, which dissolves it and forms a solution of sulphate of quina, to which carbonate of soda is again added. The sulphuric acid combines with the soda, and the quina is thrown down in an impure form, but more free from colour than the first. It is again to be dissolved in dilute sulphuric acid, and the solution evaporated until it crystallises on cooling.

Characters and tests.—It is dissolved in (boiling) water, especially when mixed with acid. When ammonia is added to this solution, quina is thrown down; and the solution being evaporated, what remains ought not to taste of sugar. Disulphate of quinine gives up from 8 to 10 per cent. of water, at a gentle heat (90°F.). It is (totally) destroyed by fire. Freshly prepared chlorine being first added, and then ammonia, it becomes green. When 100 grains are dissolved in water mixed with hydrochloric acid, and chloride of barium is added, 26·6 grains of sulphate of barytes are obtained after it has been dried by being heated in a red fire.

Ed.—A solution of 10 grains in f℥j of distilled water, or two or three drops of sulphuric acid, if decomposed by a solution of half an ounce of carbonate of soda in two waters, and heated till the precipitate shrinks and fuses, yields on cooling a solid mass, which when dry weighs 7·4 grains, and in powder dissolves entirely in solution of oxalic acid. This test is only intended to prove generally, that the salt is a fair average sample.

A very characteristic test for quinine has been proposed by Dr. Herapath, and it is also one which is easy of application, if the quantity is not very minute. If it is, a microscope with a polarizing apparatus becomes necessary; and even such a quantity as the quarter of a grain is not very distinctly evident to the naked eye. A mixture of ʒiij of pure acetic acid, ʒj of rectified spirit, and 6 drops of dilute sulphuric acid, is employed as the solvent.

The substance to be examined is dissolved, without heat, in the smallest quantity of this mixture which will suffice; and then a drop of alcoholic solution of iodine is to be added. A copious precipitate of brilliant green scales, resembling powdered cantharides, is gradually produced, and is perfectly characteristic of quinine, no other substance being at present known to produce this effect. It is termed Sulphate of Iodo-quinine by its discoverer; and the name of Herapathite has been applied to it, in his honour, by others. It consists of $C^{20}H^{12}NO^{2}+I+SO^{3}+{}^{6}HO$. By the aid of a common pocket lens, of an inch focus, the glistening scales from the $\frac{1}{10}$ of a grain of quinine, may be readily detected amongst the amorphous iodine, which is separated when the alcoholic solution of the iodine comes in contact with the acid solution of the quinine. This deposit of iodine obscures the scales to such an extent, as to render them invisible to the unassisted eye. When the quantity of quinine is very small, it is difficult to add little enough iodine, which should be taken up, and introduced by the end of a fine glass rod.

This substance is of great interest, from its optical properties; but as they require a good microscope and polarizing apparatus for their exhibition, I shall not describe them, but shall refer the reader to Dr. Herapath's detailed account of them in the Ph. Jour., vol. xi., Apr. and May, 1852, pp. 448. and 499.; vol. xii., July, 1852, p. 6.; and vol. xiii., Nov. 1853, p. 216.

Adulterations.—Disulphate of quinine is very frequently adulterated, the substances employed being cinchonia, quinidine, salicine, sugar, starch, gum, fatty matters, salts of ammonia, and earthy substances.

Detection.—Earthy substances are not dissipated by heat.

Salts of ammonia.—If a few drops of liq. potassæ are placed upon the suspected compound, and heated in a dish, fumes of ammonia are given off if any is present, and may be detected by holding a rod dipped in muriatic acid over the dish.

Fatty matters are either undissolved by boiling water, or form a glistening film upon the surface as it cools.

Sugar is provided for by the pharmacopœial test of ammonia and the absence of any subsequent sweetness, but the following test is more easy and delicate, though it requires care in its application. Dissolve 2 grains of the suspected sample in 8 drops of water and 4 drops of dilute sulphuric acid in a porcelain dish. Heat it carefully over a lamp, and almost at the *moment it begins to boil* a black stain of charred matter will be produced at the edge of the liquid, if either sugar, starch or gum is present, even in very minute proportions, which is not the case if the quinine is pure. If the heat is continued until the dish is nearly dry, then the quinine itself becomes charred. This test, therefore, requires care not to continue the heat too long after ebullition has commenced.

Salicine.—The addition of a few drops of strong sulphuric acid produces a blood-red colour.

A test of singular beauty has been pointed out to me by Mr. Henry

Evans of Liverpool. Sulphate of quinine, when pure, crystallises from an alcoholic solution, in small needle-shaped crystals, unmarked by any striking characters; and salicine also, when alone, crystallises in needle-shaped crystals, which often lie at right angles to each other, but beyond this present nothing remarkable. When, however, the two substances are present together, and are dissolved in alcohol, they form feathery tufts of crystals of extreme beauty, when a drop of the solution is evaporated upon a slip of glass, and placed under a half-inch lens. When examined by polarized light, there are few prettier microscopic objects. Five or ten per cent. of salicine is sufficient to produce this effect.

Cinchonia. — This is detected with facility, but it is of the least consequence, medicinally speaking; and if it were not that the price is less than that of quinine, it could scarcely be considered a fraud. It is detected with great readiness by Schweitzer's test. Mix equal parts of ether and liq. ammon. Ph. L., in a test tube, introduce the suspected salt, and shake them together. If any cinchonine is present, it will be visible, in a pulverulent form, at the junction of the two liquids when allowed to rest.*

Quinidine has lately been mixed with quinine, and its detection is not easy, because it closely resembles quinine in most of its characters, and we are not at present acquainted with any test which causes either a precipitate or colour with quinidine, which differs from those produced with quinine. It is therefore out of our power, by the application of any direct chemical test, to say that quinidine is certainly present, though its effects upon polarized light are highly characteristic; but these are practically unavailable, as few persons possess the requisite apparatus. The ordinary sulphate of quinidine is above twice as soluble in boiling and also in cold water, as the common sulphate of quinine, and this difference has been proposed as a test of the purity of quinine; but on making comparative experiments with Howard's quinine pure, and the same salt purposely mixed by myself with 14 per cent. of his sulphate of quinidine, I do not find any difference of solubility, which is available as a test. Quinidine itself is less soluble in ether than quinine, and this difference furnishes a better means of detecting the presence of the former than any other with which I am acquainted; but even this is not a highly satisfactory test, because the purest quinine of commerce contains a small amount, from 1 or 2 to 5 per cent., of quinidine, and the indication of the presence of this substance is, therefore, not a proof that the quinine has been adulterated or is a bad sample. The ether test, however, such as it is, may be used as follows:—Dissolve sulphate of quinidine in water, with the addition of a few drops of dilute sulphuric acid, to promote its solution, and then add sufficient liquor ammoniæ (not the Liq. Am. fort.) to precipitate all the quinidine. Wash this with cold distilled water, until the sulphate of ammonia is removed, drain off superfluous moisture, and add pure ether, until the whole of the quinidine is nearly, but not quite, redissolved. Then take 2 or 3 grains of the purest commercial sulphate of quinine, dissolved in a few drops of water, with a drop or two of dilute sulphuric acid, and add about 10 drops of liquor ammoniæ; shake them well together, and to the gelatinous mass which will result add three or four times the bulk of the saturated ethereal solution of quinidine. On shaking them together the quinine will be dissolved, but the quinidine will form a milky-looking mixture, and will gradually separate. This should be used for comparison. Next take the suspected salt, and using the same quantities treat it in a similar manner. The eye will judge on comparing them, whether there is such a difference as to indicate intentional admixture of quinidine with the quinine.

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* Med. Gaz. vol. xxi. p. 175.

For estimating the *amount* of quinidine or cinchonine, the following plan is adopted by Dr. Herapath.

Dissolve a weighed portion of the sulphate of commerce in acetic acid by the aid of heat, precipitate the alkaloids whilst warm with caustic soda, or ammonia *in slight excess*; they will form a magma, easily collected on a filter, and washed *when cold.*

Transfer the larger lumps to a counterpoised test tube; act on the filter with boiling alcohol till no alkaloid remains attached to it, evaporate to a smaller bulk, and transfer this into the counterpoised test tube, and evaporate to dryness at 212°, and weigh the mixed alkaloids.

Act on these with the following solvent. Having well washed some sulphuric ether, saturate it with *quinidine* at 60° Fahr.

Now treat the mixed alkaloids with this solvent at 60° Fahr. in the test tube, closed with a cork to prevent evaporation, and be careful not to alter the temperature. The quinine will be dissolved, the quinidine and cinchonine left. Repeat this operation as often as necessary, and then weigh the residue dried at 212° = quinidine + cinchonine, if any. Act on those with ether pure; the quinidine is taken up, the cinchonine is insoluble and may be estimated.

The sulphuric acid having been estimated in the usual way, the loss will be the water of crystallisation together with water resulting from the imperfection in the drying process.

Now calculate the per-centages for the hydrated disulphates of commerce, according to the known atomic weights of the three alkaloids, quinine, quinidine and cinchonine.

CINCHONA (Pentandria Monogynia; Cinchonaceæ).

Botany.—The botany of the cinchonas is still in an incomplete state; and it is generally acknowledged that we are still ignorant of the true source of the red bark.

In former times cinchona barks were principally brought from Peru; but there is now an extensive importation from St. Fé de Bogota. The trees are naturally either large shrubs or considerable forest trees; but they have been cut down in such numbers that they are now generally small. They are mostly evergreens, and their flowers are pink, which circumstance directs the bark gatherers to the part of the forest in which the trees are situated. They grow at an elevation varying between 1,200 and 10,000 feet above the level of the sea, and are sometimes cut down before the bark is removed; but occasionally it is separated first, and the naked tree is left standing.

Description and varieties.—Three species of cinchona are officinal in the London Pharmacopœia, which differ considerably in appearance one from another. All are occasionally, and the pale bark is generally, covered with *lichens*, which are very commonly leafy or branched, but are sometimes white, crustaceous, and closely adherent, resembling an epidermis. *Fungi* only grow upon diseased or dead branches; and the bark to which they are attached must therefore be considered bad.

Epidermis.—Cinchona barks are divided into two classes, dependent upon the colour of the epidermis, which in some instances is *white* or *yellow*, but in others *brown*. The brown cinchonas are the most valuable; the white are termed *spurious*, and are seldom brought to this country, though a few pieces may generally be found mixed with the others in a chest of the brown variety.

Coating.—Cinchona bark consists of a thin *epidermis* and a thick cracked *rete mucosum*, which is destitute of medicinal properties. Within these is the *liber* or true bark, which contains all the active principles. The first two layers are termed the "coating," which is not always present; and those barks which are uncoated are the most valuable.

Quilling. — When the bark is separated from small branches, its edges roll inwards in drying, and constitute "*quills.*" Each of the varieties of cinchona is sometimes *quilled;* and the pale bark is *always* in this form.

Fracture.—Bark ought to break with a resinous fracture. If it splinters much, it is not good.

C. Pallid. Thin, and folded; externally brown; often covered with lichens, and fissured by numerous transverse, and sometimes circular cracks; internally of a cinnamon brown colour; bitter astringent in flavour.

Cinchona Pallida—Condaminea—Lancifolia.—Pale, Crown, or Loxa bark.—This is always quilled, the pieces being from six to fifteen inches long, and from the thickness of a goose-quill to that of the little finger. The bark itself is thin, being from $\frac{1}{30}$ to $\frac{1}{8}$ of an inch thick. It is *always* coated, and is characterised by the very numerous transverse and longitudinal cracks in the coating; and it is generally more or less covered with lichens. Its colour externally is grey or dark brown; and its name (pale) is derived from the pale colour of the inner layers (liber). This was for some time the most highly valued of the cinchona barks. It contains principally *cinchonia*, and is more aromatic than the other varieties. There is no precipitate of sulphate of lime on the addition of sulphuric acid, or of a soluble sulphate, to the infusion.

C. Flav. Thick; composed principally of very slender pointed fibres, either convoluted or flat, either grey or brownish externally; furrowed longitudinally, and divided by deep transverse or even circular fissures; generally naked (without "coating"), and of a cinnamon-brown colour. It tastes very bitter. From ℔j of this bark about ʒiij of disulphate of quinine should be obtained by the aid of sulphuric acid.

Cinchona Flava—Calisaya.—Yellow or Royal Bark.—It occurs in quills, and also in large flat pieces, in both which forms it may be either coated or uncoated. Its quills are distinguished from those of pale bark by their greater size and darker colour. Quills as small as those of pale bark may be found in every chest or "*seron*" of yellow bark; but they are generally twice the diameter, and the bark itself is thicker. Fine quills of yellow bark are frequently put by druggists into their show bottles. The colour of the interior of the bark is yellow. The flat pieces vary from one to three inches in breadth, and are generally twelve or fifteen inches long and one-quarter or one-third of an inch thick. They are little or not at all folded inwards at the edges, and, unless when coated, are never covered by lichens. Their distinguishing character is their yellow colour internally. Yellow bark contains principally *quinia* with a little cinchonia. It contains also so much *lime* as to cause a precipitate of sulphate of lime, when sulphate of soda is added to the infusion. This is sometimes used as a test of the value of the bark, as the quantity of lime generally happens to bear a close relation to that of the quinia.

C. Rubr. Thick; either quilled or flat; externally rough, with ridges, furrows, or warty elevations: of a red, or chesnut-brown colour; bitter in flavour.

Cinchona Rubra — Red bark.—It is quite uncertain what tree yields this bark. It occurs in quills and also in large flat pieces. The quills are about the same size as those of yellow bark, from which they are distinguished by the red colour of the interior. The flat pieces are almost always *very thickly coated;* and the coat, which has a deep red colour, is generally deeply cracked. The powder is reddish; and it is this character alone which effectually distinguishes this from the yellow bark. Red bark contains *quinia* and *cinchonia* in nearly equal proportions.

Barks for which cinchonas may be mistaken — Pale bark may be mistaken for *Cascarilla.* It is generally, however, in much larger pieces, more perfectly quilled, of a darker colour, and covered with *pale*-coloured lichens. Cascarilla is in shorter pieces, not so perfectly quilled, more twisted longitudinally, seldom entirely covered with epidermis; but upon that which does adhere are minute *black* lichens like black lines and dots: and its odour is highly aromatic when thrown upon hot cinders. Pale bark is distinguished from quilled yellow bark by the characters above described. *Uncoated yellow and red barks* may be mistaken for elm bark. They are distinguished by the generally parallel direction of their fibres, whilst those of elm bark are arranged so as to constitute the characteristic grain of this wood; and elm bark is generally thinner, broader in proportion to its length, and much less brittle.

Adulterations. — Cinchona bark is not often purposely adulterated; but it is sometimes mixed with spurious barks having a white or yellow, instead of the proper brown or reddish epidermis. Powdered bark is almost invariably mixed with inert powders; and sometimes bark from which the extract has been prepared, is ground and mixed with it. The only mode of detecting the fraud is by analysing the powder, and finding the amount of quinine present.

Composition. — Thick, butyraceous *volatile oil*, which is the odoriferous principle. *Tannic acid*; this exists most abundantly in the best barks, and the amount of precipitate on the addition of gelatine or of tartar emetic, is therefore employed as a test of the value of different specimens of the bark. This tannic acid quickly absorbs oxygen, and forms *red cinchonin*, which *precipitates tartar emetic*, but not *gelatine*. Hence the quantity of these two substances precipitated by infusion of bark bears no regular proportion to each other. This red cinchonin is nearly insoluble in cold water, and is formed more rapidly if the bark has been long subjected to heat, on which account the decoction is not so good a form for the administration of bark as the infusion. *Kinic acid*; this exists combined with the cinchona alkalies. It is soluble in alcohol, ether, and water, and does not precipitate acetate of lead, but does precipitate the dinacetate (*Pereira*).

CINCHONA ALKALIES.

Quinia or α Quinine; Quinidine or β Quinine; Cinchonia; and Aricina.

Composition. — These are all considered to be oxides of a hypothetical base termed *quinogen*, which consists of C^{20} H^{12} N. Cinchonia is quinogen + O^1. Quinia and Quinidine are quinogen + O^2 * (and Aricina is quinogen + O^3 ?).

Characters.— They are all decomposed and entirely dissipated either by heat alone, or when burned with nitrate of ammonia. They are precipitated by tincture of galls, which is therefore used as a test for the value of different specimens of bark; and they are also precipitated by ammonia, and by oxalate of ammonia.

Differences between Cinchonia, Quinia, Quinidine, and Aricina.

Cinchonia, C^{20} H^{12} NO, is crystalline; infusible when dry; requires 2500 parts of water for its solution; is slightly soluble in boiling alcohol, and readily crystallises from its solution on cooling. It is almost insoluble in ether. The *disulphate* is in four-sided prisms, is soluble in fifty-four parts of cold water, or in six parts of alcohol, and, when acted upon by chlorine, and then by ammonia, it yields a reddish solution.

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* It is necessary, in making this statement, to point out the great discrepancy between the analysis of Heijningen and Leers, p. 181.

Quinia, or α Quinine, $C^{20} H^{12} NO^2$, is amorphous; is fusible; is soluble in 200 parts of boiling-water; is more soluble in alcohol than cinchonia, and is very soluble in ether, crystallising with great difficulty from its solutions. The *disulphate* is in silky needles, soluble in 570 parts of cold water, about thirty parts of boiling water, and eighty parts of alcohol. Chlorine, and subsequently ammonia, cause a beautiful emerald-green colour.

Quinidine, or β Quinine, $C^{20} H^{12} NO^2$[*], or $C^{36} H^{22} N^2 O^2$[†], was discovered by Winckler. It is present in variable proportions in all the cinchona barks, but it is chiefly obtained from some of the cheaper non-officinal ones which are imported from New Granada. It so closely resembles ordinary quinia in its chemical properties and composition, as to have received the name of β quinine, to distinguish it from ordinary quinine, which is now termed α quinine. It differs from common quinine, however, in being less soluble in ether, and in its optical properties. (See p. 175.) It dissolves in 1858 parts of boiling water, in 12 parts of alcohol of sp. gr. ·835 at 62°F.[‡] and in 10 parts of ether.[§] When freshly precipitated, and dried at a temperature below 130° C. 266° F., it is a hydrate, and contains 2 eqs. of water. It is capable of combining with several acids and forming salts, which in many respects closely resemble those of ordinary quinine. The sulphate is the only one of medicinal interest at present, being the only one which has as yet been employed in the treatment of disease. (See QUINIDINÆ SULPHAS, p. 190. For some very detailed accounts of this comparatively new alkali, see Ph. Jour. vols. vii. ix. xi. xii. & xiii.)

Aricina was supposed to be distinguished from both by becoming green on the addition of nitric acid, but its existence as a distinct principle is very doubtful. It was only supposed to exist in the arica or lesser cinchona.

Amorphous Quinia, or Chinoidine or Quinoidine. — After all the quinine has been separated, a dark-brown bitter solution still remains behind, in which a substance has been discovered which was said to be identical in chemical composition with quinine, but differed from it in being incapable of crystallising. It combines with sulphuric acid, and forms a dark-brown mass, which becomes dry on evaporation, but never crystallises. It is said to be similar in chemical composition with quinine, and in medicinal properties also; and being only half the price, it is a valuable addition to our list of antiperiodics and tonics.

Proportion of alkalies in bark (Soubeiran and Von Santen). —

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[*] Heijningen, Ph. Jour. vol. ix. p. 325.

[†] Leers, Ph. Jour. vol. xii. p. 296.

[‡] Idem.

[§] My own experiments made with Herring's β Quinine. Pereira says it requires 142 parts of ether, and Van Heijningen 90 parts (*Ph. Jour.* 1849-50, p. 325.).

	Sulphate of quinia.	Cinchonia.
Pale bark (℔ss)	53 grs.	88 to 118 grs.
Coated yellow bark	160 to 177 grs.	2 grs.
Uncoated „	202 to 218 grs.	
Red	118 grs.	59 grs.

Medicinal properties.—*Febrifuge*, or rather *antiperiodic; tonic; aromatic; astringent.* Bark causes corrugation of the tissues. In some states of the system it is *tonic* and *stomachic*, whilst in others it is *irritant* or *stimulant*. In *large* doses it causes, in a healthy person, dry tongue, thirst, nausea, constipation, or sometimes purging and vomiting, disordering the general alimentary system; and it excites feverishness, headache, and giddiness. All these symptoms are much increased if there is previous irritation or disorder of the stomach. In *general debility without* gastric derangement, its good effects become evident, and it then acts as an aromatic tonic. It was, however, in the cure of *intermittent fever*, that this bark first acquired, and still retains, its high celebrity. It speedily causes a diminution of the severity, and generally an immediate cessation of the attacks of fever. The alkali quinia is stated by Dr. Taylor, of University College, to diminish the size of the spleen in ague.*

A portion of quinine passes through the system unchanged, being carried off by the kidneys, and may be detected in the urine by Herapath's test of the effect upon polarized light produced by the sulphate of iodo-quinine (p. 175). In a case in which forty grains of sulphate of quinine were taken in twenty-four hours, he found 11·3 grains in the urine. About one-fourth therefore had passed through the system unchanged, but we are not at present in a position to say whether this proportion always passes off, or whether it is only when large quantities are taken that this is the case. Nearly thirty grains, or three-fourths of the whole quantity, had in some way disappeared in the system; and if the quantity taken had been smaller, it is possible that the whole might have been assimilated instead of only three-fourths. Upon this subject, however, our knowledge is at present very limited. (See Herapath's paper, Ph. Jour. vol. xiii. Nov. 1853, p. 216.)

Characteristic effects.—Bark is by far the most powerful and valuable febrifuge or antiperiodic which we possess. Its aromatic principle distinguishes it from the pure bitters or astringents; and its astringency distinguishes it from the pure bitters. Its action, compared with other tonics, is characterised by its liability to disorder the cerebral system, and in some cases, to produce alimentary irritation and disturbance, as vomiting and diarrhœa. From other antiperiodics, as arsenic and sesquichloride of iron, it is distinguished by its astringency, and by the absence of poisonous effects if given in an overdose.† The usual dose also differs essentially from that of arsenic; and whilst it is often good practice to cut short an intermittent at once by a large dose of cinchona, instead of gradually subduing the fever by repeated small doses, the latter practice is the only one which can be safely attempted by arsenic.

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* Lancet, 1841-2, vol. ii. p. 71.

† The following cases appear to be exceptions to this rule. A patient under the care of M. Recamier, in the Hôtel Dieu, took forty-eight

Uses.—*Intermittent fever.* The first dose of bark frequently prevents the return of the febrile paroxysm. In *remittent fever* it is not so useful: and its employment is still less beneficial in *continued fever.* In the former, however, it is often advantageously administered, if the remissions are well marked; and they may frequently be rendered distinct by the exhibition of an emetic and an active cathartic, which, by removing some source of internal irritation, produce considerable abatement of the febrile state. In continued fever, it is of no service until the febrile state is succeeded by that of prostration, when it often arrests the sweatings which then occur, and which are neither critical nor beneficial. In all cases, the object is to render the disease as perfectly intermittent as possible; and this object must be attained by depletion or such means as the individual cases may require.

I have left the above statement as it stood in the first edition of this work; but since that was written the attention of the profession has been powerfully called to the employment of quinine in ordinary *Typhus fever,* by Dr. Dundas of Liverpool; and his recommendations have been fully tested in this town, with upon the whole very favourable results. His plan may be briefly described as consisting in giving *at least* gr. v to gr. x of the disulphate of quinine three times in the day or oftener (even so frequently as every two hours for the first four or five doses) in ordinary cases of typhus, undeterred by either head symptoms, or a black and coated tongue. Under this treatment the tongue rapidly clears, the head symptoms abate, though not always rapidly, the powers of the patient are sustained, and a case which under ordinary treatment would last four, five, or six weeks is sometimes convalescent at the end of a week, though still suffering from remaining debility. Dr. Dundas lays great stress upon the amount of dose above mentioned. Three or four grains twice or three times a-day he does not consider as complying with his terms; and in comparative cases treated, the one with the full doses and the other with the medium ones, the result has been in favour of the full ones. When a practice claiming novelty is first introduced, its results are generally put forth with a *couleur de rose:* but as this plan has now been tested for nearly three years in the Liverpool Fever Hospital (150 beds, Dr. Gee, and Mr. Eddowes), the West Derby Fever Hospital (about 50

grains of disulphate of quinine in one day, for the cure of acute rheumatism. He took the same quantity the next day, and was then suddenly seized with violent agitation and furious delirium, and died in a few hours. On examination, the cerebral membranes were found much inflamed. In another case, at the same time, very dangerous symptoms were produced by eighty grains of the disulphate, taken in twelve hours.

[illegible] Mr. [illegible] the Manchester Union Fever Ward (80 cases, Mr. [illegible] and by other observers, we are able to speak with a considerable amount of experience; and the following statements convey the general result arrived at in the present state of our knowledge:

1st. That in many cases a threatened attack of typhus is cut short, and immediate recovery produced, by three or four of the full doses of quinine.

2nd. That in general the duration of the disease is materially shortened, and that many cases recover which would, in all probability, be hopeless under any other treatment.

3rd. That the treatment is not to be given up or considered inefficacious under a trial of at least three or four days. If during this period no improvement is manifested, but the patient becomes worse, it may be changed; but if he does not become worse, even though no material amendment should be perceived, the quinine plan should be persevered in.

4th. That the presence of a black and coated tongue, and of considerable head affection does not forbid the employment of this remedy; and that even some increase of head affection ought not to put an immediate stop to its employment.

In such a case Dr. Dundas advises that it should be discontinued for a time, and small and repeated doses of tartar emetic substituted until free vomiting is excited. After this no medicine should be given for twenty-four hours; and then the quinine should be resumed as at first. Sometimes the tinnitus aurium becomes so distressing as to oblige the entire discontinuance of the quinine; but unless it is really considerable, it is not generally desirable to omit the remedy on account of it.

Purgatives and cold to the head, shaving, &c., may be employed as usual; but they are not often resorted in the Liverpool Fever Hospital.

5th. That the occurrence of a dry teasing cough or of *any* bronchial or pulmonary symptoms requires the immediate discontinuance of the quinine, until the disorder of the respiratory organs has disappeared. It is right, however, to add that the testimony on this point is not quite so uniform as upon the others; a slight cough not being considered by all the witnesses to require the discontinuance of the quinine.

"In all cases where the complication was well established, whether pneumonia, ulceration of the bowels, or cerebral congestion, cinchonism produced very little good."

In opposition to an immense preponderance of testimony in favour of this plan of treatment, Dr. A. W. Barclay, St. George's Hospital, has observed, "One fact has been most striking and unmistakeable, and that is the effect of the remedy when pushed to its full extent. The pulse is depressed, the vital powers are prostrated, and vomiting ensues." In his cases the average duration was longer than when no quinine was used, in some no benefit was derived from it, and in many there was no distinct physiological effect produced by it. "I must here distinctly state, that, when I commenced this report, I had no idea what the result would be, and, so far from believing it unfavourable, hoped that the treatment of fever with quinine would have been rather more speedy, safe and effectual than by the ordinary mode. I am sorry to be convinced that it has no advantages." (Braith. *Retros.* vol. xxvii. p. 9, *et subs.*)

Dr. H. Bennett also reports not favourably upon the results in eight cases. (Rank. *Abs.* vol. xv. p 259.)

For fuller details upon this important subject see Braith. vol. xxiv. xxv. xxvii., and Rank. vol. xv.

My own experience does not enable me to speak decidedly, as I have only given it a fair trial in four cases. In three it produced marked benefit; in the fourth there was no improvement after a fair trial of a week, but the patient was convalescent in a few days after it was discontinued, and simple saline treatment was substituted.

In *most* strictly *periodical diseases*, as in *neuralgia*, especially of the *head*, and occasionally in *hectic*, when the intermissions are well marked and regular, cinchona and its alkalies are useful; and Dr. Christison has frequently found it of value in the fever of children, when there are well-marked intermissions or remissions. *It will not produce any good effect in the ague*, which is dependent upon *stricture of the urethra*, or any other organic affection, which can only be cured by the removal of the exciting cause. Mr. Hogan has found the disulphate of quinine of great service in several cases of spasmodic *asthma*, when given in a dose varying from two to eight grains, and repeated in an hour if relief did not follow.[*] In *chorea*, if accompanied with great debility, it is sometimes useful; but in *epilepsy*, unless the attacks are regular and periodic, it seldom produces much benefit. In *gangrene* and *putrid ulcers*, and also in *erysipelas*, it formerly enjoyed a high reputation; but modern practitioners have little confidence in it, in these diseases, except as a simple tonic. In *acute rheumatism* it has been commended by Morton, Heberden, and Haygarth; and Dr. Davis, of University College, who has written very strongly in its favour in this disease. General bleeding should be premised, if necessary, and an emetic and purgative exhibited; after which the bark must be given in ℈j or ℥ss doses, every three hours. In his cases the sweats were much diminished, the sufferings of the patient lessened, the strength little impaired, and the cure effected in from a week to a fortnight, with less than the usual risk of a relapse. He leeches the joints at first, if necessary.[†] Devergie also advises the same plan of treatment; but he gives the disulphate of quinine, in divided doses, to the extent of gr. xv or gr. xxx in the course of the day, though in this way it frequently occasions headache and cerebral congestion.[‡] This plan appears to me deserving of much more extensive adoption than it has hitherto received, and my own experience strongly confirms the above statements of "more rapid recovery, less pain, less lingering convalescence, and smaller liability to relapse." Iodide of potassium may be advantageously combined with it, though the mixture appears unchemical; and the physician who cares more for the relief and speedy cure of his patient, than for being able to say which of his remedies has contributed most to the recovery, will not be unwilling to unite the opiate treatment with that here recommended (see Tinct. Opii,—*Medicinal properties and uses.*—*Acute rheumatism*), if his own results correspond with those I have observed in adopting it. In *chronic rheumatism*, remaining after an acute attack, when the active symptoms have been reduced by bleeding and depletion, &c., but the pain and swelling remain, and the pulse is compressible, bark or quinine often produces the best effects, and is frequently the most useful medicine in relapses. The patient, in the second attack, cannot bear depletion as at first, and cinchona often supersedes the necessity for it. In *scrophulous ophthalmia*, or strumous inflammation of other organs, it is useful. In *chlorosis*, with great pallor and deficiency of the red particles of the blood, it is not so valuable as preparations of iron. In *general debility* following long illnesses or surgical operations, or accidents attended with great loss of blood, it is most valuable, and is the best remedy for the *intense local pain* in the *head* which sometimes *follows severe hæmorrhages*. In *dyspepsia* it is *injurious* when there is gastric irritation, as in such cases it often excites nausea or vomiting. In *low puerperal fever*, Dr. Denman did not find any advantage from its employment. In *excessive mucous discharges*, dependent upon debility, bark may be useful. As an *antidote* to poisoning by *tartar emetic*, infusion or decoction of bark is recommended on account of its tannin, which forms an insoluble precipitate with the antimony; but tincture or infusion of galls, or, on an emergency, green tea, is quite as efficacious.

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[*] Lancet, 1840-1, vol. i. p. 576.

[†] Ibid. 1841-2, vol. i. p. 580.

[‡] Ibid. 1837-8, vol. ii. p. 266.

Comparative value of different barks.—Yellow bark is at present the most popular; but some years since, pale bark was much preferred; and Dr. Rigby found red bark the most useful in the agues in the fenny districts of the eastern counties. Hence it is probable that they are all nearly equally valuable.

Administration.—*Form.* Bark is now seldom given, compared with quinine. The powder is the best form if it can be retained by the stomach; to effect which object, it is often combined with some aromatic powder, as cinnamon. An infusion is better than a decoction; and Bentley says that a *cold* infusion is the best form, as all the active principles are dissolved by cold water, and the tannic acid is not so quickly converted into the insoluble red cinchonin. The tincture is a good form as a general tonic. The use of bark should generally be preceded by an emetic and purgative.

Period.—Bark has been given with advantage during every stage of an intermittent; but it is now generally administered in a full dose previous to the accession of the febrile paroxysm, and in repeated doses during the interval. If given during the hot stage, it is more liable to excite vomiting.

Dose.—In the intermittents of this country, from gr. xii to gr. xx of disulphate of quinine, in a single, or in divided doses, generally suffice; but in those of hot climates, gr. xxx to gr. xc are sometimes required. Bark may be given in a very large dose at once, or in repeated moderate doses. Sometimes the first plan answers best, but it is liable to be rejected by the stomach. A patient in the Leeds Infirmary had taken moderate doses for some time, without benefit; but on one occasion he mistook the directions, and took at one dose a pint of the decoction, which contained also a considerable addition of powdered bark. His stomach did not reject it, and his ague was perfectly cured from that time. The usual *dose* of *the powder* as a febrifuge, is ℈j to ʒj, or more, every three hours, if the stomach can bear it. Of the *infusion*, f℥ij to f℥iv. Of the *decoction*, a similar quantity. Of the *extract, which is a very bad form*, ℈j to ʒj. As a *simple tonic*, about half these doses. The *simple and compound tinctures* are only employed as tonics, in doses of ♏xx to fʒj.

In order to cover its bitterness, it has been proposed to combine it with tannic acid, in the proportion of gr. ij of the acid to gr. x of the salt of quinine; and in an elaborate report read to the Acad. of Med., Paris, by M. Bouvier, it was stated that the tannate of quinine thus formed was as efficacious as the sulphate itself. The addition of ♏xv to ♏xxv of chloric ether to each dose of quinine covers the taste of the quinine without affecting its solubility.

Incompatibles.—Alkalies and metallic preparations.

Officinal preparations of Cinchona.—Decoct. (of each). Ext. (of each). Infus. and Infus. Spissat. (flav. and pallid.). Tinct. (flav. pallid.). Tinct. co. (pallid.).

QUININE.

Medicinal properties and uses.—I shall only mention under this head, those particulars in which the salts of quinine differ from the preparations of bark.

The disulphate of quinine is not so liable as bark to cause vomiting, when given for the cure of intermittent fever; and in any case in which the necessary *quantity* is *large*, it is to be preferred. It is also more frequently given as a general tonic; but in many cases where the stomach is inclined to be irritable, a moderate dose of infusion of pale cinchona will be retained, in consequence of the aromatic principle present in the bark itself, when the quinine is rejected, owing to the absence of any aromatic ingredient. The disulphate of quinine is liable to excite headache and fulness and flushing of the face, if continued for many days together, and not unfrequently, disordered bowels; occasioning sometimes diarrhœa, at other times simply irregularity. As there is no tannic acid present in the salts of quinine, it is evident that they cannot be substituted for decoction of cinchona as an antidote for poisoning by tartar emetic. The general rules for the administration of this alkaloid are the same as those for the use of cinchona.

Dose and administration.—In ague, some practitioners give gr. viii or gr. x at once, and endeavour to put an immediate stop to the disease; but, in general, repeated doses of gr. ij or gr. iij answer better. As a general tonic, I have never seen better effects produced by doses of gr. iij than by those of gr. j, or at the most gr. ij; and the larger quantities are more liable to disorder the bowels and cause headache. Those who employ the large doses have often appeared to me to defeat their own object, and instead of imparting more strength, have only excited feverishness by the extra quantity.

Disulphate of quinine is generally prescribed in compound infusion of roses; but it is difficult to account for this choice, which is not recommended by a single advantage. It is nearly the worst possible combination in which it can be administered; for the tannic acid in the roses causes a precipitate of tannate of quinine, which gives the mixture a disagreeable muddy appearance, and is in danger of not being taken. This objection is not removed by the addition of more sulphuric acid, independently of the circumstance that the infusion is already sufficiently acid. An elegant substitute may be composed of ♏xl to f℥iss of dilute sulphuric acid, and two drachms of syrup of red poppy to eight ounces of water.

It is often prescribed in the form of pills, made up with confection of dog roses. If bread crumb is employed, the mass soon becomes so hard as in some cases to pass through the bowels unaffected.

Composition of disulphate of quinine.—$2\,a\ \mathrm{Quin.} + SO^3 + 8\ HO$.

QUINÆ MURIAS, *D.*

Muriate of Quinine.

Take of Sulphate of quina, one ounce.
Chloride of barium, one hundred and twenty-three grains.
Distilled water, thirty-two ounces.

The chloride of barium is to be dissolved in two ounces of the water, and the quinine in the remainder when raised to 212°; they are to be mixed, and the precipitate of sulphate of barytes separated by filtration. The remaining solution of muriate of quinine is to be evaporated in a water bath till it crystallises.

Medicinal properties and uses precisely the same as those of the disulphate.

HOSPITAL QUININE (Herring's).

This salt, which has the appearance of ordinary quinine slightly tinged of a brown colour, has been introduced into practice as being equal to the ordinary sulphate, but cheaper, because there is less loss in consequence of the decolorisation not being carried so far as in procuring the pure salt. I have made many inquiries as to its virtues, and thus far the reports, though still scanty and imperfect, are in its favour. As first brought into the market it is said to have contained a large per-centage of quinidine; but Herapath, who makes the statement, has lately pronounced that the so-called "Patent Quinine" of the same manufacturer is a very pure one (Ph. Jour. March, 1854, p. 436).

PATENT SULPHATE OF QUININE (Herring's).

Process of manufacture.—The first part of the process is treating the bark with a boiling caustic alkali. The powdered bark is boiled with a solution of caustic soda or potash, and then pressed and washed with water until the whole of the colouring matter of the bark has been removed. After being thus treated, the bark, which has been deprived of its colouring matter, retains the greater part of the alkaloids in an uncombined state. The blood-red alkaline liquors resulting from the boiling and washings, which contain a small quantity of quinine, are retained for subsequent treatment. The bark is, in the next place, boiled with dilute sulphuric acid, so as completely to exhaust it of the alkaloids. The liquor is concentrated, filtered, and precipitated with solution of caustic soda or potash. The precipitated alkaloids are combined with sulphuric acid, and the sulphates of quinine, quinidine and cinchonine are separated from each other by repeated crystallisation, and previously to the last crystallisation, are decolorised with pure animal charcoal.

The blood-red alkaline liquors, referred to above, are treated in the following manner:—Muriatic acid is added so as to render them acid; they are then filtered and precipitated with slaked lime. This precipitate is washed, pressed, dried, and powdered. The alkaloids contained in this precipitate are dissolved out with benzole, and the solution in this menstruum is agitated with dilute sulphuric acid, by which the alkaloids are transferred to the latter, which is afterwards separated by decantation. This acid solution is precipitated with caustic soda or potash, and the alkaloids are treated as described in the former part of the process (Ph. Jour. Nov. 1853, p. 209).

QUINÆ SULPHAS AMORPHA. (Not Off.)

AMORPHOUS SULPHATE OF QUININE. CHINOIDINE, QUINOIDINE.

Remarks.— This preparation is not officinal. It is obtained from the mother liquor after the separation of the disulphate. (See CINCHONA ALKALIES, p. 181.) It corresponds in medicinal properties with the ordinary disulphate. Mr. J. H. Taylor informs me that he has found it equally useful with the other in the agues of Kent; and my own more limited experience in this town, where ague is rare, confirms his observation. As a general tonic and antiperiodic in tic douloureux, I have also found it efficient, and it has almost displaced the other in my practice. It is peculiarly valuable in charitable institutions, from being only about half the price of *quinine.*

It was introduced into practice as being identical with quinine, except in the fact of its being uncrystallisable; but it has been thoroughly proved that it is not a peculiar principle either identical with any other, or differing from others by definite characters, but a mixture of quinine, cinchonine, and quinidine in variable proportions, with colouring matter and a resinous residue. It has been examined with great care by Heijningen, who states that 100 parts of unadulterated quinoidine contain about 2 per cent. of quinine, 6 or 8 per cent. of cinchonine, and 50 to 60 per cent. of quinidine.*

QUINIDINÆ SULPHAS. (Not Off.)

SULPHATE OF QUINIDINE, OR SULPHATE OF β QUININE.

This salt has not hitherto been much used knowingly by the profession, though it has probably been employed unconsciously to a considerable extent as an accidental or intentional adulteration of sulphate of quinine. It is always present in a *small* proportion in this salt as manufactured even by chemists of the highest character (Howard, Ph. Jour. vol. xi. p. 393.); it forms a large proportion (50 to 60 per cent.) of quinoidine or amorphous sulphate of quinine (Heijningen, Ph. Jour. vol. ix. p. 327.), and it was extensively present, either as an unknown mixture or a fraudulent adulteration, in "Hospital Quinine" when first it was introduced for use in hospitals on account of its cheapness. I have not been able to gain much information as to its effects when used alone. Bauduin found it as useful in intermittent fever as sulphate of quinine (Ph. Jour. vol. ix. p. 327.), and from the utility of the amorphous quinine into which it enters so largely, it is probable that its effects are nearly, if not quite, identical with those of quinine. We still, however, want information upon this head, and it would be at present an unjustifiable fraud to substitute the one for the other. Pereira mentions having used it with success in all the cases usually benefited by quinine; but he mentions the dose as having been ten grains, and Dr. Davies informs me that the sample used contained about 10 per cent. of quinine, which renders any experiments made with it fallacious.

Characters and tests.—Sulphate of quinidine so closely resembles ordinary sulphate of quinine in appearance and taste, as to be scarcely distinguishable. It is, however, more soluble in water, requiring only ten parts of boiling water for solution, whilst sulphate of quinine requires nearly thirty times its weight. For the characters of quinidine itself, see *Quinidine,* p. 181.

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* Ph. Jour. vol. ix. pp. 322. 327.

Composition.—$2\ \beta$ Quin. $+ SO^3 + 6\,HO$. Van Heijningen, Ph. Journ. 1849-50, p. 326.

β Quin. $+ SO^3 + HO$. Leers, Ph. Jour. 1852-53, p. 297.

Dose and administration.—These will probably be the same as those of quinine, if experience shall prove their medicinal effects to be similar. Its price is much less than that of quinine, and it will prove a valuable addition to our Materia Medica, if it proves to be even nearly equal to quinine in efficacy. The dose in which it has hitherto been prescribed has been larger than that of quinine, running up to ten grains.

QUINÆ VALERIANAS, *D.*

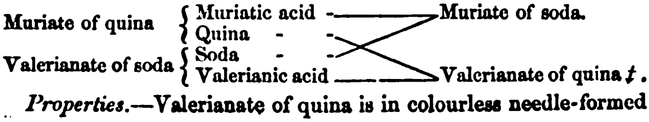
VALERIANATE OF QUININE.

Take of Muriate of quina, seven drachms.
Valerianate of soda, one hundred and twenty-four grains.
Distilled water, sixteen fluid ounces.

Dissolve the valerianate of soda in two ounces, and the muriate of quina in the remainder of the water, and the temperature of each solution being raised to 120°, but not higher, let them be mixed, and let the mixture be set by for twenty-four hours, when the valerianate of quina will have formed a mass of silky acicular crystals. Let these be pressed between folds of blotting-paper, and dried without the application of artificial heat.

Instead of weighing out seven drachms of muriate of quina, and dissolving it in water, as above described, we may employ the solution of the muriate prepared from an ounce of the sulphate, as directed in the formula for Quinæ Murias, such solution having been first evaporated to fourteen ounces. It may be observed here, that should it become necessary to evaporate a liquid containing valerianate of quina, care must be taken that its temperature does not rise higher than 120°.

Explanation of process.—Both valerianate of soda and muriate of quina are readily soluble in water, but when mixed together in solution the valerianic acid combines with the quina to form valerianate of quina, and the muriatic acid with the soda to form muriate of soda. The valerianate is only slightly soluble, and gradually separates from the solution.



Properties.—Valerianate of quina is in colourless needle-formed crystals, which are so small as scarcely to be recognised as crystalline. They are readily soluble in hot water, from which they are deposited in delicate crystals as the solution cools, if it is not very dilute. The solution is precipitated by nitrate of barytes, but the valerianate of barytes formed is redissolved when gently heated with nitric acid. They are dissipated when heated upon platinum foil. They have an odour of valerian, but it is not nearly so strong as that of the valerianate of zinc.

Tests and adulterations.—The most probable impurity is sulphate of quinine, which may be detected by forming a precipitate with nitrate of barytes, which is insoluble in boiling nitric acid.

Medicinal properties and uses.— Tonic and antispasmodic. It was very much cried up when first introduced into practice, as combining the properties of quinine and valerian, and was given in such diseases as *chorea*, *hysteria*, and some cases of *epilepsy;* but the confidence of the profession, at any rate in this town and neighbourhood, is much reduced, and where an ounce was consumed a few years since, a drachm is not required now.

Dose and administration.—Gr. j. to gr. ij. It is best given in the form of pills.

SALICINA. (Not Off.)

SALICINE.

SALIX CAPRÆA (Diœcia Diandria; Salicaceæ).

Preparation.— Salicine is prepared by boiling willow bark in two or three successive portions of water, and evaporating the decoctions until the concentrated liquor is about thrice the weight of the bark employed. The liquor is then digested for twenty-four hours with finely pulverised oxide of lead, and the clear liquor evaporated to the consistence of syrup. After some days it forms a crystalline mass, which is separated from the mother-liquor, and purified by solution in hot water, and subsequent crystallisation on cooling. Any remaining lead may be separated by sulphuretted hydrogen, and the solution subsequently decolored by animal charcoal, and evaporated. It then yields pure salicine. (Brande's *Man.* ed. 6. p. 1379.)

Explanation.—The decoction of willow bark contains tannate of salicine, and on digesting this with oxide of lead, the tannic acid combines with it, forming an insoluble tannate of lead, whilst the salicine remains dissolved in the *hot* solution, from which it separates on becoming cold.

Properties.— Salicine is colourless, neither acid nor alkaline, but capable of combining with acids. It is but slightly soluble in cold water, but is soluble in hot water and in alcohol. It becomes *deep blood-red* on the addition of *sulphuric acid*, by which it is distinguished from all other vegetable principles except veratria and piperin, from both of which it is distinguished by not becoming deep red on the addition of nitric acid.

Composition.—$C^{26} H^{18} O^{14}$= eq. 286. It is remarkable that a body possessing such active properties as salicine should contain no nitrogen.

Another test for salicine is obtained from the action of sulphuric acid and bichromate of potash, which convert it into the fragrant substance, *oil of meadow-sweet*, or hydruret of salicyle (salicylous acid). If about equal parts of salicine and bichromate of potash are dissolved in about a drachm of water, and five or six drops of sulphuric acid are added, and the mixture is heated, the odour of meadow-sweet is evolved as it begins to boil. For another test for salicine see "Adulterations of Quinine, *Salicine*," p. 175.

Medicinal properties and uses.—Tonic and antiperiodic; febrifuge. It has been tried sufficiently to prove its powers in *ague*, which are similar to those of quinine, though very inferior in point of strength. As an ordinary tonic it is of considerable value.

Dose.—The ordinary dose is from gr. ij to gr. x. It must be given in doses of gr. x to ℈j or more, three or four times daily, before any good can be expected, if the ague is at all severe. It is fraudulently mixed with quinine to a very great extent. I have known 30 *per cent. of salicine* in quinine supplied by a large manufacturing chemist; and in some professed quinine supplied to merchant vessels nearly the whole was salicine. The fraud is easily discovered by the sulphuric acid test.

SANTONINUM.

SANTONINE. (Not Off.)

Preparation.—This substance is obtained from the flower buds of Artemisia santonica or Semen contra (wormseed), Nat. ord. Compositæ, Linn., class and ord. Syngenes., Polygamia superflua.

Preparation.—(Pharm. Badensia, copied from Gray's Sup., Ed. 1848).

Take of Wormseed, powdered, 4 parts.
Hydrate of lime, 1¼ „

Mix and repeatedly treat them with spirit, sp. gr. 0·93°. Distil three-fourths of the spirit off, and evaporate the remainder to one-half, which, at a boiling temperature, is to be mixed with excess of acetic acid; water is then to be added, and the mixture left standing, that the impure santonine may subside, which is to be washed with a small quantity of spirits; then dissolved in ten parts of boiling spirits, decolorised with animal charcoal, strained and allowed to crystallise.

Explanation.—In the first part of this process the santonine in the wormseed, acting like an acid, combines with the lime, and forms a compound soluble in spirits. From the solution thus obtained it is precipitated by the addition of the acetic acid which combines with the lime, and sets the santonine free; which, being but slightly soluble in cold spirit, gradually subsides. It is afterwards purified by solution in boiling alcohol with animal charcoal.

Characters.—It is obtained in the form of small white crystals, which are very slightly soluble in water, but are soluble in forty-three parts of cold, or 2·7 parts of boiling alcohol (*Brande.*) It is not soluble in acids, and consequently is not dissolved in the stomach; but it is soluble in even feeble alkalies, and is dissolved by the secretions in the duodenum and small intestines, which allows it to exert its full influence upon the parasites inhabiting these regions; and prevents its being carried into the circulation direct from the stomach.

Composition.—$C^{30}\ H^{18}\ O^{5}$.

Medicinal properties and uses.— Santonine and Semen contra have long been in use as a *vermifuge;* but I am not aware of any description of the systems and effects produced so full as the following by Mr. Jones of Anglesey:—"It is of no use in the treatment of teniæ, but in cases of lumbrici or ascarides it is of essential value; and even when no worms are visibly expelled, it removes the symptoms which have given rise to the supposition that they were present. It produces a singular effect upon the sight, colouring objects green; and it imparts a yellow colour to the urine." In his practice the remedy has been singularly successful; but Mr. Long of Liverpool, who has used it frequently, though reporting upon the whole in its favour, has not found it of such value as Mr. Jones. It is more than possible that the diet and habits of the Anglesey people, and their consequent constitution, being different from those of residents in Liverpool, may account for the difference in the result in the two places.

Characteristics as a vermifuge.—Tasteless; small doses; peculiar effect upon vision; colours the urine; only useful in round worms; peculiarly efficacious?

Dose and administrations.—The total quantity given should not exceed gr. vi, or gr. viii; and it should be divided into three doses, one to be given every night, and followed up at last by a purgative. It is best administered as a powder mixed with sugar.

STRYCHNIA, *L. D. E.*

STRYCHNIA, OR STRYCHNINE.

This alkaloid is placed by the London College in the Materia Medica, and therefore no directions are given for preparing it. The Edinburgh Ph. directs the seeds of nux vomica to be exposed for some hours to the action of steam, then chopped or sliced, dried, and ground to powder in a coffee mill. They are then to be boiled repeatedly in water, and to the solutions, which contain the strychnia combined with igasuric acid, milk of lime is to be added in excess. The lime combines with the acid and forms an insoluble igasurate of lime, and the strychnine is precipitated at the same time. This mixed mass is to be boiled in spirit, which dissolves the strychnia, but leaves the salt of lime unaffected; and the alcoholic solution thus obtained being evaporated, the strychnia crystallises on cooling. If it retains any colouring matter, it is to be redissolved, and again crystallised.

In the Dublin Ph. the moistened seeds are to be boiled repeatedly in water containing a little sulphuric acid, which assists the solution of the strychnine. The solution is then to be saturated with slacked lime, and the precipitate boiled in spirit, which dissolves the strychnia. This solution is to be evaporated, redissolved by dilute sulphuric acid, precipitated again by ammonia, and lastly, redissolved by spirit, digested with animal charcoal, filtered, and evaporated until crystals form.

STRYCHNOS NUX VOMICA (Pentandria Monogynia; Apocynaceæ or Loganiaceæ).

Description.—The seeds of nux vomica are circular, about one inch in diameter, flat, or rather depressed in the centre, and contain a flattened central cavity, which is seen on making a transverse section of the seed. Their colour is grey, and they have a somewhat silky appearance, and downy feeling, being covered by a number of short, silky hairs externally, which are not very perceptible to the eye. The seeds are intensely bitter, and appear like horn when cut, and are remarkably tough, so as to be powdered with great difficulty; to remedy which, the Edinburgh Pharmacopœia orders them to be divided by a coarse rasp.

The bark of the tree is not officinal, but it is sometimes met with as an accidental or fraudulent adulteration of the bark of Galipea cusparia. For the distinguishing characters, see INFUSUM CUSPARIÆ.

Composition of Nux Vomica.—Both the seeds and bark contain a peculiar alkaloid called strychnia, and another termed brucia, both of which are combined with a vegetable acid, called igasuric acid.

Characters and tests of Strychnia.—It is dissolved by boiling rectified spirit. It melts in the fire, and if the heat is increased, it is consumed. It tastes intensely bitter. As it is possessed of violent properties, it must be used very cautiously.

"Nitric acid strongly reddens it; a solution of ten grains in four fluid drachms of water by means of a fluid drachm of pyroligneous acid, when decomposed by one fluid ounce of concentrated solution of carbonate of soda, yields, on brisk agitation, a coherent mass, weighing, when dry, ten grains, and entirely soluble in solution of oxalic acid. Strychnia is always more or less impure." (*E.*)

The London tests prove the absence of any earthy impurity, as that would not be dissipated by heat; and of starch or fatty matters which would not be dissolved by the spirit; and the Edinburgh test proves the presence of the full weight of strychnia. The impurity mentioned by the Edinburgh Ph. is brucia, which is always present in small quantity.

Strychnia is white, crystalline, intensely bitter, fusible, but not volatile, being decomposed and entirely dissipated by a high temperature. It is almost insoluble in water, requiring several thousand times its weight for solution: but even this small quantity renders the solution intensely bitter. It is insoluble in *absolute* alcohol, and in ether; but is dissolved by diluted (rectified) spirit. It is alkaline, neutralises acids, and forms double salts with some metallic compounds; with sulphate of copper it forms a beautiful green cupreous sulphate of strychnia; the colour of which is very similar to that of arsenio-sulphate of copper, and therefore prevents this salt from being an infallible test for arsenic. If a very minute quantity of strychnia is placed upon a white porcelain dish, and moistened by a few drops of solution of bichromate of potash, and a few drops of strong sulphuric acid are then added, a beautiful play of blue and red colours is instantly produced, and is rendered extremely evident by turning the dish in various directions (*Marchand*). The strychnia from a single nux vomica seed can be shown by this test (*Brett*). When perfectly pure it is not reddened by nitric acid; but it usually contains so much brucia as to become red on the addition of this acid. Commercial strychnia has a slight grey tint, from the presence of brucia, and of some adhering colouring matter.

Brucia is almost always associated with commercial strychnia. It becomes red on the addition of nitric, iodic, or chloric acid, and forms a yellow solution, the colour of which is destroyed by sulphurous or hydrosulphuric acid. It forms a white precipitate with chlorine. If strong nitric acid is dropped upon brucia, it becomes deep red. When *heated*, the colour becomes yellow. Let it cool and add protochloride of tin, and the colour becomes a rich purple violet. This is a very characteristic test, and distinguishes brucia from strychnia, which is not similarly affected.

Composition.— Strychnia consists of—

C^{30},H^{16},O^{3}, N; eq. 234 (*Phillips*).

$C^{42},H^{22},O^{4},N^{2}$; eq. 334 (*Regnault*).

Medicinal properties.—Nux vomica and strychnia agree in their general medicinal properties; but the alkali is much more powerful and energetic than the seeds.

Strychnia is a most active and powerful poison. One-sixth of a grain produced the death of a dog in two minutes, when injected into its vein; and half a grain, when blown into another dog's mouth, killed it in five minutes (*Christison*). It appears to act upon the spinal cord, independently of the brain; for even when its constitutional effects are produced with violence, the intellect remains unaffected, and continues so until death, in cases of poisoning by this substance.

There is great diversity in the period at which the symptoms of poisoning appear, and the dose requisite for producing them. In a case recorded by Dr. Anderson, a patient in the habit of taking morphia swallowed by mistake 3½ grs. of strychnia. Soon afterwards he felt some degree of numbness; but it did not prevent his walking about for *five* hours, when he took a second dose of the same amount;

in less than ten minutes afterwards he was seized with violent tetanic spasms, which continued for eight hours, and then subsided, and the patient recovered. In another case tetanic symptoms appeared in less than five minutes after a person had swallowed not more, it was supposed, than gr. $\frac{1}{4}$ or gr. $\frac{1}{2}$ of sulphate of strychnia, and death occurred within twenty minutes of taking the poison.*

In small doses (gr. $\frac{1}{12}$ or gr. $\frac{1}{16}$) it is *tonic* and *diuretic*, and sometimes acts as an *aperient* and *diaphoretic*. It seldom affects the pulse. If this dose is repeated, or a larger one is given, at first muscular pain and weakness are produced, sometimes preceded by general formication. The voluntary control over the muscles is diminished, and a very slight cause produces involuntary contractions. Pereira has remarked that the earliest evidence of the commencing action of the medicine is to be found in the hamstring muscles. If a smart tap is given to the ham, the patient becomes unsteady, and is in some danger of falling. The pain and involuntary contractions extend throughout the body, affecting both the muscles of locomotion, and those of the pharynx, larynx, and bladder, and sometimes causing painful erections of the penis, even in impotent old age. The slightest cause, as a touch, moving in bed, a deep inspiration, and sometimes no appreciable circumstance, will throw the whole body into a state of violent tetanic spasm; and in this condition death takes place if the dose has been a poisonous one. These effects are produced even in paralysed muscles; and they are *almost always first noticed in the paralysed limb.* During the intervals of the paroxysms, the patient is generally free from pain, but previous to death there is sometimes anxiety and stupor. The rigidity of the muscles occasionally continues after death; but the heart cannot be stimulated to contract, its irritability being exhausted. Even during life, the pulse is sometimes very feeble and quick, though it is often unaffected. The brain is sometimes found *softened, especially in the neighbourhood of the clot*, if strychnia has been given after a *recent attack of apoplexy.*

Cause of death.—Spasmodic condition of the respiratory muscles preventing respiration. In some cases it appears to be dependent upon complete exhaustion of the nervous energy.

Is strychnia a cumulative poison?—Christison states unhesitatingly that it is not. Pereira mentions some cases which make him rather doubtful about it. The following cases added to his, appear to leave no doubt that it is cumulative.

A young woman admitted with amenorrhœa into the Meath (Co. Dublin) Hospital, under Dr. Graves, during my clinical clerkship, was ordered gr. $\frac{1}{16}$ of strychnia three times daily. She continued it for a month, and took in the whole about 2½ grs. As no effects of any kind were produced, she was desired to discontinue it. The next day she began to experience painful contractions in the muscles of the face, which extended to the neck, arms, abdomen, and legs. It was six weeks before she became entirely free from them; and during this time no treatment afforded much relief. Opium liniments seemed the most useful.—Mr. Scott, a very intelligent surgeon, communicated to me the case of a man who took ¼ of a grain of strychnia, gradually increased to a grain, twice a-day, for a fortnight. During this period it produced no apparent effects, but he was suddenly seized one morning with violent cramps of the abdominal and respiratory muscles. These subsided in a few hours, under the use of large doses of laudanum and hot whisky, and the man had no further return of the cramps. Strychnia, from the same sample, had been given to other patients in the hospital, and had produced its usual effects.

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* Ranking's Abs. vol. vii. p. 352.

Uses. — *Paralysis.* It is more frequently useful in *paraplegia* than in *hemiplegia*, though even in this disease it is sometimes of service. It ought not to be given when inflammatory action is present, or if there be any symptoms of ramollissement of the brain; nor after a recent attack of apoplexy, in which the clot is still large and fresh. In paralysis, dependent upon apoplexy, it can only be useful when the clot is hard and contracted, and the paralysis is dependent upon long habit rather than upon any active cause. In such a case the motor nerves may resume their functions, if once excited into action by this medicine. In *lead palsy* it is frequently very useful, and Dr. Thompson finds that the local application of the alkali upon a blistered surface, is an efficient method of treatment, in the *hand-drop* of this disease.* In *ptosis* and *amaurosis*, its good effects are rare. In the latter disease it is generally applied *endermically*; or gr. ⅛ to gr. ss mixed with two or three grains of sugar or salt, is sprinkled upon a freshly blistered surface near the orbit. It seldom, however, produces much benefit. When likely to be efficacious, it causes the appearance of red sparks before the eyes; and the more numerous these are, the more favourable is the symptom. In *incontinence of urine*, *tremor* from habitual intemperance, and in *chorea*, it is sometimes useful. Dr. Pidduck confirms the statement made by other writers of its good effects in *neuralgia*, especially of the infra-orbital nerve; and he has also seen it beneficially employed in sciatica.† In all these neuralgic affections, and especially the paralytic ones, Christison remarks that good effects are perceived early, if they are likely to be obtained at all. Dr. Wilkinson ‡ speaks strongly in favour of this remedy in the treatment of *intermittent fever*. "During a four years' residence in Cambridge I had opportunities of seeing the treatment of a vast number of cases of intermittent fever; but in no one instance, as far as my memory serves me, was recovery nearly so rapid as I have seen it after the administration of this powerful remedy." In a number of cases which he alludes to, "in all these cases the disease has succumbed to doses of strychnia of about gr. 1/25 to gr. 1/50, and this without the use of any other medicine than an occasional purge of calomel or jalap." The form in which he uses it is 2 grains of strychnia dissolved in an ounce of dilute phosphoric acid. Dose ♏v (*i.e.* gr. 1/50) to ♏x (gr. 1/25) three or four times a-day. Dr. Marshall Hall has used it in the *epilepsy* attended by pallor, thinness, and nervous exhaustion; in the paraplegia, the result of sexual excesses; and in paralysis agitans. The cases reported are not yet sufficiently numerous to stamp its effects with certainty, though they are favourable so far. He dissolves it in acetic acid, and gives gr. 1/50 for a dose three times a-day for months. "In two cases only have I known it disagree. In many the patient has improved in general health and strength without experiencing anything but good from it."* Dr. Corson considers strychnia and nux vomica invaluable in the treatment of *functional diseases of the heart*, especially in excessive debility of that organ, and in dyspeptic complications."† Dose gr. 1/60 to gr. 1/30. ℞. Strychnia Sulph. or Acet. gr. i, Acid. Acet. Spt. Vini, āā ʒii, Aquæ. ℥ss; solve. ♏x contain gr. 1/50. In *pyrosis* the late Dr. Belcombe, of York, employed the extract of nux vomica with success; and Mr. Mellor, of Manchester, has lately called attention to its good effects in the anæmial gastrodynia of that and other large towns.‡ He prefers the powdered seed in doses of gr. ij to gr. iv. In *epidemic dysentery* and *prolapsus of the rectum*, it is sometimes serviceable. It has been employed with variable results in anæmial *amenorrhœa*. In *impotence* its effects are only temporary; though it sometimes induces virility during its employment. It has appeared to be useful in some cases of *habitual constipation*, when there has been a general deficiency of nervous energy. I have repeatedly witnessed remarkable benefit from the extract of nux vomica in the *atonic diarrhœa* of young children, of the class found in town workhouses, in which the continuance of the diarrhœa appears to depend upon simple loss of power in the stomach and small intestines to digest the food, and in the large intestines and rectum, to retain the fæces. (See EXT. NUCIS VOMIC.)

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* Lancet, 1842-3, vol. i.

† Med. Gaz. vol. xxvi.

‡ Lancet, Dec. 1853, p. 601.

In that most obstinate and distressing disease *hay fever*, Mr. Gream has found the tincture of nux vomica of great service, and he says that he has employed it with success for several years. He gives ♏x of the tincture three times a-day, and gradually increases the dose to ♏xx; at the same time it is right to add that he applies high up the nostrils an ointment of Liq. Plumb. Diacet. ʒiss, Cer. Cetacei ℥ii, Ol. Rosæ or Bergamotæ a few drops.§

Antidotes. — No specifics are known. The immediate discontinuance of the medicine, opium, and stimulants are most generally serviceable; and artificial respiration, if necessary. Vinegar and coffee are said to be injurious. Pereira suggests the use of conia, or extract of hemlock, as the muscular paralysis which it produces is an exactly opposite state to the tetanic contractions excited by strychnia. In a case of accidental poisoning by an over dose of strychnia, Dr. Pidduck gave gr. v of camphor, which so completely stopped the "frightful convulsions" under which the patient was suffering at the time, that a second dose was not required.* This is the only case I have met with in which any antidote employed appeared to have been really of service.

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* Lancet, Nov. 27, 1852, p. 486.

† Lancet, April, 1854, p. 394.

‡ Med. Gaz. vol. xix.

§ Lancet, June 8, 1850.

Doses.—The alcoholic extract of nux vomica is about one-sixth of the strength of strychnia, and must be used in proportional doses. It is in many cases a better preparation than the alkali, as being less active and costly; so that it is less liable to adulteration, and the dose is more easily apportioned. Strychnia is usually given in doses, beginning with $\frac{1}{16}$ or $\frac{1}{12}$ of a grain, and increased gradually to gr. ss or even gr. j. There is great difference in the susceptibility of different habits to its influence. I have known severe painful cramps produced in a very enfeebled patient, by a single dose of gr. $\frac{1}{16}$; whilst Pereira has seen gr. jss repeated several times without producing any effect; and this difference cannot be ascribed to the alkaloid being adulterated, when the large doses have been without effect; for I have known a similar discrepancy in the effects upon different patients who were taking the same sample at the same time. I have also seen it in the cases of dogs to whom strychnia was given as a poison. When it is applied endermically, as in amaurosis, the quantity of the alkali should not exceed half a grain; or of its salts, which from their solubility are much more active, one-fourth of a grain. The severe pain sometimes excited by the local application is best relieved by sprinkling a little acetate of morphia upon the blistered surface. The medicine is usually given twice or three times daily; but Christison says that nothing is gained by using it oftener than once a-day, which ought *always to be at bed-time.* It may be administered in pills made with conserve of roses, and some dry powder; or, if used immediately, with bread-crumb; or it may be given in solution in alcohol, or in vinegar. As the strength of different samples varies, the dose ought always to be reduced, when a fresh specimen is administered.

The dose of the alcoholic extract is gr. ¼ to gr. ij. In prolapsus of the rectum, Dr. Schwartz dissolves gr. j or gr. ij of this extract in f℥ij of water. The dose for an infant is two or three drops; for older children, ten to fifteen drops. In colica pictonum it should be combined with some salt of morphia.

STRYCHNIÆ MURIAS, *D.*

MURIATE OF STRYCHNIA.

Take of Strychnia, an ounce.
Dilute muriatic acid, a fluid ounce, or a sufficient quantity.
Distilled water, two ounces and a half.

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* Lancet, July 24, 1852, p. 80.

Pour the acid upon the strychnia, and adding the water, apply heat until a perfect solution is obtained. Let this cool, and let the crystals which form, be dried upon bibulous paper.

Properties and uses.— This is a nearly colourless salt, in small crystals. Its characters correspond with those of strychnia, and its medicinal properties are the same as those of that alkaloid.

Dose.— The dose should not exceed gr. $\frac{1}{16}$ to begin with, but may be increased to gr. ss, or gr. j, once or twice in the day.

VERATRIA, *L. E.*

This substance is placed by the London College in the Materia Medica, and no directions are given for its preparation. It is not contained in the Dublin Pharmacopœia at all; but the Edinburgh College directs it to be obtained by percolating with spirit the fruit of Sevadilla, first soaked in water until soft, then dried and ground, previous to the percolation. The spirit dissolves the veratria, combined with veratric acid, and some resin, oil, and colouring matter; and the concentrated solution, when thrown into water, is decomposed, the resin and oil being precipitated and the veratrate of veratria dissolved by the water. Ammonia is then added, which combines with the veratric acid, and the veratria is precipitated, collected on a filter, and washed with cold water.

This veratria is not pure, chemically speaking, being still slightly coloured; but it is sufficiently so for medicinal uses. The quantity present in the sevadilla is so small, that Christison has seldom obtained above 1 grain from 1000.

Properties. — Veratria, when pure, is a colourless, pulverulent and not crystalline alkali. It is almost insoluble in either hot or cold water, but is soluble in boiling alcohol, and slightly so in ether. It is decomposed and entirely consumed by heat. The positive chemical characters by which it is distinguished from other substances are, its acridity; its incapability of crystallising; its insolubility in water; and in its forming a blood-red colour with fuming sulphuric acid, and also with nitric acid. See also COLCHICINA, ACET. COLCH. p. 68.

Composition.— Veratria consists of (*Couerbe*)

34 eqs. carbon, 204; 22 eqs. hydrogen, 22; 6 eqs. oxygen, 48;
1 eq. nitrogen, 14=$C^{34}H^{22}O^{6}N$; eq. 288.

Characters and tests.— It is very slightly soluble in water, more so in ether, but most of all in rectified spirit. It has no smell, but it violently irritates the nose, and has an acrid taste. It is to be very cautiously used.

There is no security against adulteration, except the character of the chemist who prepares it.

Medicinal properties and uses.—When topically applied to the nose, veratria excites immediate sneezing, and when applied to the skin generally, it causes heat and tingling, sometimes extending to distant parts. It causes powerful *contraction* of the *pupil*, when rubbed above the orbit, for which purpose it is frequently employed by Mr. Neill, who states that it seldom fails. It frequently causes acute *stinging* pain in the forehead, which continues for some hours; and violent sneezing, even when not applied to the nose. If a small quantity by accident touches the eye, the pain is most acute for some time, but no permanent bad consequences follow. The cases in which Mr. Neill has found it most beneficial, are those of permanent dilatation of the pupil, remaining some weeks or months after concussion of the brain; and sometimes after operations on the eye. In these cases it seldom fails of success. Taken *internally*, it causes heat in the stomach, creepings and cutis anserina in the skin; sometimes bilious stools and vomiting; but frequently constipation. It has been used in *gout* and *rheumatism*, in *paralysis*, *hooping cough*, *epilepsy*, &c., and when made into ointment, has been rubbed upon the skin, in *neuralgia*, *tic douloureux*, &c.; but its good effects in all these affections are uncertain, and inferior to other remedies which are better known.

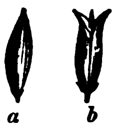
Dose and administration.—Veratria is seldom or never given internally. If so employed, it should be made into pills, in doses of ¼ of a grain. It is used chiefly in the form of ointment composed of half a drachm of veratria and an equal quantity of olive oil, with an ounce of lard. It should be applied by means of a small sponge fastened upon a stick, so that friction may be employed at the same time.

A useful form for its local employment is, veratria, gr. ss; chloric ether (in which it dissolves readily, without the aid of heat), f℥ij; soap liniment or glycerine ♏xxx. (*Neill*).

SABADILLA—*CEVADILLA*, *E.*, Helonias Officinalis

(Hexandria Trigynia; Melanthaceæ).

Description.—The whole plant has a strong resemblance to the grasses. The leaves are about four feet long, and a third of an inch broad, and the spike, which is a foot long, is somewhat similar to that of barley. The fruit consists of three follicles, which are either united throughout their extent, *a*, or are separated and open superiorly, *b*. It is about half an inch long, and from two to three lines broad. The seeds often escape from the open fruit; when they do not, there are generally three in each follicle.

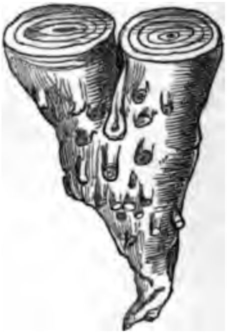


Seeds for which it may be mistaken.—*Barley or fennel.* It is distinguished from both, by the separation of the follicles: and even when these are united, the lines of their junction may still be traced.

Composition. — *Veratria* (sabadillin); *veratric acid; resin.*

Officinal preparations. — They are only used to furnish veratria.

VERATRUM ALBUM, White Hellebore (Polygamia Monœcia; Melanthaceæ).



Description. — Veratrum album grows from one to four feet high; the leaves are broad and sheathing; and the root is generally in pieces from one to three inches long, and has somewhat of a conical figure, the base being formed by the divided stem and concentric leaves of the plant. Some roots contain the sections of two stems, as in the drawing, whilst others have but one. The roots are dark brown externally, but yellowish-white internally, and are surrounded by the short broken root fibres.

Roots for which it may be mistaken. — *Acorus calamus.* The concentric leaves and the short round root fibres distinguish veratrum album from acorus.

Composition. — *Veratria* and *gallic acid.*

Medicinal properties. — *Acrid; narcotic; emetic;* and *errhine.* Veratrum acts as a violent acrid when applied to any part of the mucous membrane, and causes excessive sneezing when applied to the Schneiderian membrane. In *small* doses, it increases the mucous, salivary, and cutaneous secretions; and in *larger* ones, causes vomiting, purging, and sometimes bloody stools. It is stated to be a very certain emetic. The root, when applied to the skin, sometimes produces these effects. In *excessive* doses it excites violent gastro-enteric inflammation, with its usual symptoms, and shows its narcotic powers by inducing faintness, giddiness, dilated pupils, blindness, convulsions and death. There is great prostration of the heart's action and power.

Uses. — Veratrum is seldom employed on account of the violence and supposed uncertainty of its action. It has been used as a cathartic in *melancholia*, *mania*, and *epilepsy*, and as an errhine in *amaurosis* and some *chronic cerebral affections.* In *chronic skin diseases*, as *herpes*, the tincture has been given internally; the ointment and decoction have been applied externally for the cure of *scabies*, in Germany; and the decoction is sometimes employed to *kill lice.*

In *gout*, the tincture has been given in doses of ♏xxx to f℥jss, combined with laudanum.

Antidotes. — Astringent infusions, stimulants, demulcents, and opium.

Doses. — Of the powdered root, gr. j to gr. ij, mixed with gr. vi or gr. viii of starch, as an *errhine;* as an *emetic,* gr. viii. Of the wine, as a substitute for colchicum in gout, ♏x, twice or thrice daily; the dose should be gradually increased.

Officinal preparations.— None.

ANIMALIA.

PREPARATIONS FROM ANIMALS.

CARBO ANIMALIS PURIFICATUS, *D. E.*

PURIFIED ANIMAL CHARCOAL.

Take of Ivory black, one pound,
Muriatic acid (commercial),
Water, of each twelve fluid ounces.

Ed. Mix the acid and water: add gradually the ivory black, stirring occasionally. Digest with a gentle heat for two days, agitating from time to time. Then boil, dilute with two pints of water, collect the undissolved charcoal on a filter of linen or calico, and wash it with water till what passes through scarcely precipitates with solution of carbonate of soda. Heat the charcoal, first moderately, and then to redness, in a closely-covered crucible. (The Dublin process is similar to the above.)

Preparation.—*Animal charcoal* (ivory black) is obtained by exposing blood, flesh, and bones to such a degree of heat as to char the organic matters and drive off the volatile parts, whilst at the same time the supply of air is so limited as to prevent the perfect combustion and loss of the charcoal formed. The mass which remains in the crucible or furnace is a mixture of carbon and phosphate and carbonate of lime, derived from the earthy portion of the bone. This is afterwards purified by digestion in hydrochloric acid, which dissolves the salts of lime, but leaves the carbon unaffected.

Vegetable charcoal is obtained by the slow and imperfect combustion of wood, with a very limited supply of air. The watery and volatile portions are driven off by the heat, and the carbonaceous parts remain.

Peat charcoal (not off.) is merely a variety of vegetable charcoal, obtained by the slow combustion of peat in a similar manner. It is very superior to common wood charcoal, as a deodorizing agent.

Properties. — Charcoal possesses the property of absorbing or combining with animal and vegetable colours, and thus removing them from bodies with which they are associated. This property exists in a much higher degree in animal than in vegetable charcoal, and, on this account, the former is always employed in pharmacopœial processes. Vegetable charcoal has the power of absorbing many times its volume of various gases, and is sometimes used for this purpose. It also absorbs odours and flavours, and is sometimes employed to remove both from tainted meat, and to correct the fœtor of offensive sores; but for all these purposes common wood charcoal is infinitely less useful than animal charcoal.

Mr. Hovell has found great advantage in a case of incontinence of urine in an old paralytic patient, by placing a calico bag two feet square, loosely filled with Irish peat charcoal, under the patient. "It completely neutralises all unpleasant odour, and, if the bed becomes partially wet, all the offensive ingredients are absorbed and neutralised by the charcoal. It is not necessary to change the charcoal frequently." (Br. Retrosp. vol. xxv. p. 447.)

Uses. — Charcoal is never administered internally, except by homœopathists. It is frequently employed as a dentifrice, and is often applied in the form of poultice, to correct the fœtor of offensive sores. The chief use, however, of charcoal is for the removal of colour from various preparations, such as the vegetable alkaloids. In preparing some of these, acids are employed which would act upon the earthy salts contained in the animal charcoal, to prevent which, its purification is directed.

CASTOREUM, CASTOR.

Description. — Castoreum is a peculiar secretion obtained from both male and female beavers. It is contained in two sacs, situated in both sexes between the bladder and anus, which are connected together, and open by a common orifice into the prepuce of the male, and the side of the vagina in the female. These sacs vary much in appearance. Their figure is pyriform; the small extremities being connected by a short, thin, fibrous band or cord, and they are from two to three inches long. Their colour varies much, being sometimes brown, and at others yellow or reddish. The sacs are occasionally covered with a sort of bluish mould, and are generally wrinkled externally, and sometimes soft and yielding, but at other times hard and dry. The castor itself, when fresh, is thin, fluid, yellow, or orange-coloured, becoming darker on exposure to the air, and possesses a strong peculiar odour. The quantity in each sac is very variable.

It is principally brought from Hudson's Bay. An inferior kind is obtained from Canada. Russian castor, which is the best, is now very scarce.

Composition.— *Volatile oil*; *resin*; and *earthy salts*. A very small quantity of a peculiar fatty, crystallisable substance (castorine) is found in Russian castor.

Medicinal effects. — *Stimulant* and *antispasmodic*. It is considered to possess a specific influence over the uterus. It occasions disagreeable eructations.

Uses. — Castoreum is employed in various *spasmodic diseases*; and "certainly proves beneficial as an adjunct to anti-hysterical compounds."* It is, however, very little used in this country. On the Continent it is more highly esteemed.

Dose and administration.—It may be given in the form of bolus in doses of gr. x to ℈j (*Paris*), of at least ʒij (*Pereira*). The tincture is advantageously combined with ammonia, when used in hysteria. Dose, ♏xx to fʒij. It might very well be omitted from the Pharmacopœia altogether.

COCCUS CACTI, COCHINEAL.

Description. — Cochineal is a small insect, the female of the Coccus cactus. The male is of no value in trade. It is only cultivated in Mexico. It appears like a number of grains, one or two lines long, wrinkled, and marked with little furrows in every direction. The colour is very dark red, and the surface often appears as if covered with a fine, whitish, silvery powder. It is almost impossible to discover the grains to be insects until they are put into water, when they swell up and show their feet. They are not soluble in water, but they communicate a red colour to it.

Collection.—When the females are impregnated, they are swept off the trees, killed by immersion in boiling water, and then dried in the sun. The finest cochineal is killed by being *stoved after* laying its eggs.†

Composition.—Cochinelline (carmine) and animal matter. The cochinelline is soluble in water or alcohol, and has a brilliant purplish-red colour. When precipitated from solution along with alumina, it combines with the earth, forming the brilliant *lake* called carmine. In this paint there are, however, some other constituents, and the mode of its manufacture is kept a secret.

Adulterations. — It is stated that cochineal is extremely adulterated by bread crumbs rolled in the palm of the hand (by which they receive the markings seen in real insects), and afterwards coloured with the genuine cochineal, and dried.

Medicinal properties and uses.—Cochineal is employed in medicine, chiefly for the sake of its colour. It has been considered diuretic, diaphoretic, antispasmodic, and when combined with carbonate of potash, it is a popular remedy for hooping-cough; but when given alone I have not been satisfied that it has done either good or harm. Many persons speak in its favour, but they always give it along with carbonate of potash; and the efficacy of the cochineal is therefore not really put to the test. Dr. Allnatt speaks highly of its efficacy in this complaint.

Dose.—Gr. ij to gr. v, with gr. x of carbonate of potash, three or four times daily.

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* Paris, Pharmacologia.

† Faber, Pharm. Jour. vol. v. p. 312.

CORNU USTUM, *L. E.*

Burnt Horn.

Synonyme. Cornu Cervi calcinatum. Cornu Cervi ustum.

This is now placed in the Materia Medica. The following directions were given in the last Pharmacopœia: —

Burn pieces of horns in an open vessel until they become perfectly white; then powder and prepare them in the same manner as directed with respect to chalk.

Description and properties.—Horn (hartshorn) consists principally of gelatine and phosphate of lime. When it is burnt, the organic elements of the gelatine become differently arranged, and form various salts of ammonia, which are volatilised with other volatile compounds. It was to a weak solution of ammonia obtained from this source that the term spirits of hartshorn was originally applied. By long-continued burning, the carbon of the gelatine is dissipated as carbonic acid, and little remains but phosphate of lime.

Uses.—Horn is introduced into the Pharmacopœia for the purpose of making the pulvis antimonii compositus, of which the phosphate of lime remaining after the combustion of the horn, constitutes a principal ingredient. This salt of lime is perfectly inert, though it was at one time given to rickety patients, with the intention of supplying the deficiency of bone earth in their bones. Experience does not, however, show it to possess any value in this disease. By boiling horn shavings in water the gelatine is dissolved, and forms a nutritious jelly, which corresponds with calves' foot jelly in character and effects; and was at one time held in high reputation. Some practitioners even now recommend a jelly made by boiling ivory, or common bone shavings, obtained from the bone-turners; but it does not differ in properties from those above mentioned.

FEL BOVINUM (Inspissatum; not Off.).

Ox-Gall (Inspissated).

The fluid from the gall-bladder of the ox is to be evaporated in a water-bath to a consistence suitable for making pills.

Medicinal properties and uses.—Ox-gall was at one time a fashionable remedy, and shared the fate of many others of falling afterwards into unmerited neglect. It acts beneficially in many cases of sluggish bowels, with a deficiency of bile in the fæces, and in irritability of the stomach accompanied by vomiting soon after taking food. In some chlorotic cases it has proved very useful when ordinary aperients have failed to act, and has restored regularity to the action of the bowels, so that purgatives were afterwards unnecessary. It is sometimes combined with one or two grains of aloes.

Dr. Clay says he had dyspepsia, every kind of food turning acid, violent headache, constant epigastric pain, great constipation, frequently three or four days without a motion, subject to these symptoms for seven or eight years. *Purgatives always produced great irritation for several days.* He took gr. viij of inspissated ox-gall, not having had a motion for four days. In three hours, "without the slightest sensation of pain, or the common feelings arising from having taken purgatives," he had a free, *soft*, copious motion. He continued its use occasionally: "when under its influence," the acidity left his stomach, pain left his head, and "my bowels are now quite regular." Again: A woman, thirty-eight years old, constipated from childhood, bowels generally ten days at a time without a motion, had frequently taken eight or ten ounces of castor oil, or a dozen or twenty pills, before they would act; and the stools then hard and dry. "I gave gr. viij of ox-gall three times a day. In little more than six hours, and before taking the third dose, she had a very copious motion unaccompanied by sickness or pain." The pills were gradually reduced in frequency, and after taking them at intervals as she required them, for six months, her bowels became quite regular, and continued so after an interval of months previous to the publication of the report.*

I have met with other evidence of a similar character in favour of this remedy.

Dr. Clay has also found inspissated ox-gall useful in counteracting the constipating effects of opium.

"In *marasmus* in children or *atrophy* in adults, I have in ox-gall a valuable remedy. In acidity of the stomach in children it is of most decided and immediate relief. The curdled vomiting, green motions, and griping disappear, and a better state of health is substituted. *An antacid preparation is indicated, which is one of the peculiar properties of this remedy.* It produces no excitement to propel, but by liquefying the fæces facilitates their excretion. I prefer giving the gall alone, inspissated to such an extent as to form a pill mass; but if it is too soft, I prescribe Fel. Bov. Inspis. ʒij, Ol. Carui ♏x, Magn. Carb. *q. s.* If made into thirty pills, each will contain gr. iv of ox-gall. The gall-bladder of a moderate-sized ox will yield 100 four-grain pills."—Clay, *ut supra.*

Dose and administration.—It is so intensely bitter that it should always be given in the form of pills. *Dose* gr. iv to gr. x two or three times a day.

HIRUDO, *L. D.*

THE LEECH.

Description.—Though the leech cannot be considered an animal preparation, yet it is more convenient to introduce its description in this place than under any other class of bodies.

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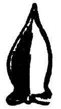
* Braith. Retrosp. vol. vi. p. 95

Back, greenish, or olive-green, with six rusty-red, or buff-coloured longitudinal stripes, which are generally broken with black spots. *Belly*, pale olive, thickly studded with olive or black spots. These are sometimes so numerous as to constitute the prevailing colour of the belly, whilst the intervening spaces appear like greenish spots. Sometimes another species is used, which differs in having the belly unspotted.

Habitat. — Leeches are imported from Hamburg; and this city derives its supplies from the Ukraine; Siberia, Bohemia, and other more frequented places having been exhausted (*Pereira*). They are also natives of England; but the number now found in our own ponds is small. The eastern counties and Wales still possess leech ponds.

Mode of catching them. — The fishermen wade into the ponds with their feet and legs naked, to which the leeches attach themselves and are afterwards pulled off. They are sometimes taken in nets.

Anatomy — Mouth.—This is placed in the middle of the oval disk which is under its head, and is triradiate. Within the mouth are three small white cartilaginous-looking plates, which are the jaws. These are hollow, pyramidal, and capable of being made rigid by the animal filling them with air, when they assume the appearance in the sketch.[*] Upon the edges of these jaws are about sixty small, finely-pointed teeth. When the animal fixes itself upon the skin, it makes the jaws rigid, and communicates a saw-like motion to them from side to side. Thus the wound is not completed at once but gradually, and is triangular, in consequence of being made by the three jaws (*Johnson*). In this way the pain is caused, which continues for some minutes after the application of the leech; and the bruising character of the wound accounts for the inflammation which sometimes succeeds a leech bite. The opening not being a clean incised one sometimes closes with difficulty, and the hæmorrhage is not easily suppressed.



Alimentary canal.—This consists of a very short œsophagus, a large stomach, and a very short intestine. The stomach occupies two-thirds of the length of the animal, and consists of ten or eleven compartments, upon each side of which are large cæcal cavities. Those from the last division are much the largest, and extend nearly to the anus. The intestine is very short and straight. When the animal sucks it fills the cæcal pouches one after another, and when the last is full it drops off. None of the blood enters the intestine.[†]

Mode of application.—It is sometimes difficult to make leeches suck. The part should be well washed, and very clean and dry; and the leech should be gently dried in a soft cloth. Sometimes a drop of cream is placed upon the desired spot, and this will now and then answer. I have found the drop of blood coming from a minute puncture with a lancet attract the leech when all other means have failed, and this plan may be conveniently used when we wish to apply them to a particular spot, as, for instance, near the canthus of the eye. Thomson recommends that they should be put into a large open quill, one end of which is to be closed with the finger, and the other, at which the head is lying, must be placed upon the desired situation. They will often take hold if put into a wine glass which is simply inverted upon the skin, when they cannot be made to bite by any other means. It is generally a bad plan to hold them in the fingers or in a cloth.

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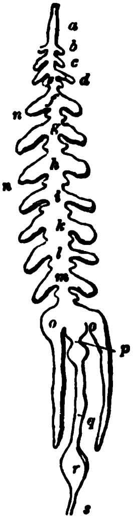
[*] Derheim's Nat. Hist. des Sangsues, quoted by Thomson.

[†] Brandt, quoted by Pereira, from whose Mat. Med. this sketch is taken.



a, Œsophagus.
b, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *k*, *l*, *m*, compartments of the stomach.
n, *o*, cæcal pouches.
p, pylorus.
q, small intestine.
r, large ditto.
s, rectum.

Cause of their falling off.—Thomson attributes this to the obstruction of their respiration, produced by the pressure of the distended stomach upon the respiratory tubes, which causes a sort of asphyxia.*

Subsequent treatment of leech bites.—A good leech seldom draws more than fʒij or f℥ss of blood. The bites should therefore be covered with a hot poultice, or should be fomented, or have cupping glasses applied. Sometimes the wounds are followed by erysipelas, or by great swelling, especially in the neighbourhood of the eye. If the bleeding does not cease when it is desirable to stop it, a dossil of lint soaked in alum, or tr. ferri sesquichlor., or down from a hat, may be applied. In a more obstinate case, the wound should be touched with a finely pointed pencil of nitrate of silver; or it may be necessary to pass a fine needle through the edges and twist silk round it, as in the operation for hare lip.

The situation to which leeches are applied is not unimportant, especially in the case of infants or children.

A position ought always to be selected in which pressure may be employed, if necessary, to suppress the bleeding. Dr. Fleming, of Dublin, told me of an infant who lost its life from the neglect of this caution. A leech was applied between the hyoid bone and the top of the sternum, for the relief of bronchitis. After its removal bleeding took place into the cellular tissue, and the child was lost from the pressure of the accumulated blood upon the trachea. In such a case, therefore, they should be placed in front of the sternum.

Treatment of the leeches.—It has been advised to cut the leeches in two, after they have begun to suck, if they are very scarce, for they then continue sucking without falling off, as the blood escapes at the same time. After this, they will not require much treatment. When a healthy leech has fallen off, it is usual to sprinkle it with salt, which makes it disgorge the blood; but this, at the same time, blisters its mouth and prevents it from sucking again for many days. It has been proposed to substitute vinegar for the salt, as that does not impair the leech. It is a common and good practice to strip the leech by drawing it through the fingers, from the tail towards the head; by which means the blood is squeezed out, and the animal will often suck again immediately. They should be kept in fresh water, which ought to be changed as soon as it is found to be bloody.

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* Dispensatory.

Uses.—It would be impossible to enumerate all the cases requiring leeches; a few, however, may be mentioned. A leech folded in linen, is frequently applied to the gum in incipient gum boil, or to relieve inflammatory toothache. Sometimes their application to the Schneiderian membrane gives great relief in congestive headache. Six or eight leeches applied round the anus, often produce wonderfully good effects in obstinate diarrhœa. Applied to the os uteri, they sometimes relieve dysmenorrhœa, but it is very probable that they would produce as much good if applied to the vulva or anus; and very few patients in private practice will submit to their application to the os uteri itself. They have been sometimes applied with good effect to the feet, to relieve severe headaches, or symptoms of apoplexy. In the inflammations or inflammatory congestions which occur during fever, leeches are preferable to general bloodletting.

MOSCHUS, Musk.

Description.—Musk is a peculiar animal production, found in a bag between the prepuce and umbilicus of the musk deer. Its colour is brown, and its odour so peculiar as to be described only by itself.

Adulterations.—The musk bag is often artificially imitated by a piece of skin from some other part of the body, sewn up so as to resemble it. The fraud is detected by the direction of the hairs, which *radiate* from the orifice of the *genuine* bag, but have all the *same direction* in the *fictitious* ones. Musk itself is often mixed with dried blood. Genuine musk leaves a greyish-white ash when incinerated, whilst the dried blood leaves a reddish ash.

Medicinal properties.—*Antispasmodic; stimulant;* and ultimately *narcotic.* It causes disagreeable eructations. Owing to its very high price, it is seldom used; though Cullen says that, when genuine, it is one of the most powerful antispasmodics which we possess. It is liable to cause headache and giddiness.

Uses.—In *hysteria* and *epileptic convulsions* of children, not dependent upon organic nervous changes. In a spasmodic affection of the pharynx which had resisted all other treatment, Dr.

Cullen succeeded in effecting a cure by its means. In *retrocedent gout* it has been highly extolled, and in the low state of typhus, accompanied with involuntary motions of the limbs.

Dose.—Of solid musk, made into a bolus, from gr. viii to ℈j; of the mixture, from f ℥j to f ℥ij.

OVUM, *L. D. E.*

The Egg.

Remarks.—Eggs are introduced on account of their pharmaceutical use, in diffusing some substances through water which are not soluble in it, as copaiba, castor oil, oils generally, and oil of turpentine. They are also used as an antidote in poisoning by corrosive sublimate (bichloride of mercury), in which case they ought to be given as early as possible, and if vomiting has not already been produced, an emetic ought to be given immediately after their administration. White of egg applied to the conjunctiva after lime or any other acrid substance has been accidentally introduced, sometimes relieves the pain quickly.

Composition.—Both the yolk and the white consist chiefly of albumen, which is coagulated by bichloride of mercury (and thus acts as an antidote), and by most metallic compounds, and by the mineral acids. Hence these ought not to be added to any mixture in which eggs have been employed to suspend one of the ingredients.

SPONGIA, *E.*

Properties and uses.—Sponge is not now used internally, though, when burnt, the ashes were formerly administered in bronchocele, under the name of *Spongia usta.* They owed their efficacy to the presence of a very minute quantity of iodide of sodium, which always exists in sponges. They are in daily use in surgical practice; and a soft sponge, when soaked in melted wax, is sometimes used as a pessary in prolapsus uteri, or as a plug to close the opening in vesico-vaginal fistula. A small sponge soaked in liq. alum. co., and retained in the vagina, forms an excellent astringent pessary in prolapsus; and is also an efficient mode of using this lotion for the cure of leucorrhœa or gonorrhœa.

AQUÆ.

WATERS.

AQUA DESTILLATA, *L.D.E.*

DISTILLED WATER.

Properties of distilled water. — It is colourless, inodorous, and insipid, owing to the absence of air, which renders common water sparkling. A pint (f℥xx) weighs 8750 grains at 62° F., or 20 ounces avoirdupois. It is not likely to be purposely adulterated, but it may contain various salts from spirting of the fluid, if the distillation is carried too far; and if the distilled water is *condensed* in a *worm* made of *lead*, it is certain to contain a portion of that metal. If long exposed it will probably contain carbonic acid absorbed from the air; and also sulphuretted hydrogen, if it is kept in an open vessel in a laboratory. If made from *spring* water, the portions first distilled often contain carbonate of ammonia, which is derived from various compounds of ammonia formed by the decomposition of organic matters in the soil. At a boiling temperature these are decomposed by carbonate of lime, if it is present in the water; and are converted into carbonate of ammonia, which is carried over with the first portions distilled.

Few chemists keep a still for the purpose of distilling water only; but unless this is done, the water will have a faint smell and taste from the last herbs which have been subjected to distillation.

Tests.—It remains clear on the addition of, 1. lime water; 2. chloride of barium; 3. nitrate of silver; 4. oxalate of ammonia; or, 5. hydrosulphuric acid.

1. proves the absence of carbonic acid or carbonate of ammonia; 2. of sulphate of lime; 3. of chlorides; 4. of lime; 5. of lead, from the worm through which it has been distilled.

Remarks. — When water is distilled the first twentieth part should be thrown away; the remainder may be kept for use. The reason is, that many spring waters, and all rain water, contain a minute proportion of ammonia, which is carried over with the first portion distilled, and renders it unfit for use. The ammonia in rain water is derived from the atmosphere, which always contains from 1 to 2 parts of this gas in 10,000,000. The source of it is the nitrogen and moisture of the air, which combine rapidly under the influence of electricity (lightning); the hydrogen of the water forming NH^3 (ammonia) with the nitrogen of the atmosphere. This fact was experimentally proved by Dr. Ryan, at the Polytechnic Institution, London. As springs are fed by rain water it is easy to account for the presence of ammonia in spring water from this source; and it also finds its way into them, from the decomposition of animal and vegetable matters in the soil. Spring and river waters contain also many other substances which unfit them for chemical uses, though they increase their value as articles of drink; of these, the most common and important are, *carbonate*, *muriate*, and *sulphate* of *lime; common salt;* and *carbonic acid.*

Many contain also *carbonate* of *iron*, which renders them *chalybeate*, and there are springs in several places, termed *mineral* or *medicinal*, from the quantity of medicinal ingredients present in them. Thus some contain *sulphate* of *magnesia* (Epsom); and others, as those at Harrogate, Cheltenham, and Leamington, contain *sulphuretted hydrogen*, and very minute quantities (never more than one grain in ten gallons, *Prout*) of iodide of sodium, in addition to the ingredients above named. *Stagnant* waters generally contain *light carburetted hydrogen;* and *quickly running streams* often contain an excess of *oxygen*. It is a curious circumstance that most *hot* springs, as those of Buxton, contain *nitrogen*. *Rain and snow water* contain more *oxygen* than spring water; and, according to Liebig, the first portions of rain which fall after a drought, contain a considerable quantity of *salts* of *ammonia. Sea water* always contains *chlorides* of *calcium*, *magnesium*, and *sodium*, and *sulphates* of the *same bases;* and a small quantity of *bromine*, in the state of *bromide* of *sodium* or *magnesium*, is invariably present. It also contains a minute quantity of *iodine* in the form of *iodides*. It is remarkable that though compounds of soda are present in most waters, yet potash is a very rare ingredient. Some waters contain a considerable quantity of organic matter, either dissolved or simply diffused through them, of which the Thames is a notable example. After being kept for some time, this undergoes a species of fermentation, and the water becomes turbid and extremely offensive; after this change has taken place, a scum rises to the surface, and the water below is pure, brilliant, and delicious. These effects are chiefly noticed at sea, when the water is kept for many months; and it is observed that no water is so good for a long voyage as that of the Thames. The change commences in about four or five months, if the ship is going into a hot climate, and is completed in two or three weeks. Some waters contain little but *carbonate of soda;* but these are very rare. A remarkably soft spring at Holbeck, near Leeds, contains nothing but this salt, and a trace of sulphuretted hydrogen.

Hard waters.—When water contains salts of lime or magnesia, they decompose soap when used in washing, and insoluble stearates and margarates are formed. (See SOAPS.) Such waters are said to be *hard*, and to *crack* the soap, and they generally feel harsh to the skin. Sometimes the salt of lime which is present, is carbonate, held dissolved by free carbonic acid. If such a water is boiled, the carbonic acid will be driven off, and the carbonate of lime becoming then insoluble, will be precipitated; the water will become opaque; and if allowed to stand, a deposit will form upon the bottom of the containing vessel. Such a water, therefore, will be rendered *soft* by *boiling*, inasmuch as the lime, which gave it its hardness, will be thus removed. In some parts of the country this plan is successfully adopted; but it is occasionally applied with an exactly opposite result. If the hardness is owing to *sulphate* of *lime*, boiling will only increase it; for this salt is slightly soluble in water, and boiling will therefore only have the effect of concentrating the solution.

Soft waters.—This term is applied to those waters which are either free from saline ingredients, or contain so small a quantity, as not to produce any effect upon soap, when used in washing. Such waters as contain salts of soda are peculiarly soft and valuable.

Analysis of Waters.

Gases. The amount of gases present may be ascertained by boiling a measured quantity of water in a flask furnished with a bent tube, and collecting the gas in a pneumatic trough. It may then be analysed. *Carbonic acid* will be detected by the precipitate formed when agitated with lime water. *Sulphuretted hydrogen* will be indicated by the smell, and the black precipitate formed when agitated with a solution of acetate of lead. *Light carburetted hydrogen*, by the formation of water and carbonic acid, when detonated with oxygen; and any residue after these operations may generally be estimated as *nitrogen.*

Carbonates will be detected by the formation of a precipitate on the addition of a solution of *baryta*, *lime*, or *acetate of lead*, which is redissolved by nitric acid.

Sulphates are shown by the precipitate formed on the addition of chloride of barium, which is not redissolved on adding nitric acid.

Chlorides are detected by the curdy, white precipitate on the addition of nitrate of silver. This salt is precipitated also by carbonates and sulphates; but chloride of silver is not soluble in boiling nitric acid, whilst the carbonate is; and the sulphate of silver may be redissolved by simple dilution with water and boiling.

Iodides are detected with more difficulty, as they occur in small quantities. Evaporate the water nearly to dryness, by which most of the saline ingredients are separated by crystallisation. A *cold* solution of starch is to be mixed with the remaining solution, and nitric acid added, or a current of chlorine passed through the solution; if an iodide is present, a *blue* colour will be formed.

Bromides. The water is to be evaporated nearly to dryness, and a current of chlorine passed through it. If a bromide is present, the solution will become yellow or brown, and the whole of the bromine will be dissolved on adding ether. To the ethereal solution, solution of potash should be added, and the ether expelled by heat. On the addition of *cold* solution of starch, and a few drops of nitric acid, a *yellow* colour will be formed.

Lime is shown by a white precipitate on the addition of oxalate of ammonia.

Magnesia forms a white crystalline precipitate on the addition of carbonate of ammonia and phosphate of soda. The precipitate does not form instantly.

Potash forms a yellow precipitate with bichloride of platinum, if the solution is moderately concentrated.

Soda is not easily detected. The solution must be evaporated to dryness, the deliquescent salts removed by alcohol, and the remainder dissolved by as small a quantity of water as possible. If soda is present, the solution will communicate a yellow colour to flame when treated as is directed under the tests for soda. (See METALLICA,—SODA.)

Iron is sometimes sufficiently evident from the yellow or rusty precipitate formed when the water has been boiled or exposed for some time to the air. On the addition of a few drops of nitric acid and boiling, ferrocyanide of potassium will give a *deep blue* precipitate. Tincture of galls and solution of ammonia produce a black one.

From these statements, it is evident that common spring or river water is not fitted for making solutions of *nitrate of silver*, owing to the presence of chlorides or carbonates; of *chloride of barium*, owing to the presence of sulphates; or of the *salts of lead*, owing to the presence of sulphates or carbonates. *Oxalate of ammonia* also, cannot with propriety be dissolved in it, owing to the presence of lime.

It is evident also that filtered water can scarcely ever be used as a substitute for distilled water, as the filtration cannot separate anything but mechanical impurities. Though distilled water is frequently ordered in prescriptions, it is only imperatively required in making solutions of the *salts* of *lead*; *nitrate of silver*; *oxalate of ammonia*; the soluble *preparations* of *mercury*; *potash*; *solution of ammonia*; *iodide of iron*; *chloride of barium*.

"Distilled waters may be prepared from fresh and, generally, also from dried vegetables. In the latter case, only half the weight of materials should be used. They may also be prepared, for the most part, by agitating the volatile oils of the plants with water, and filtering the solution. But when obtained in this way, they have seldom so fine a flavour as when obtained from the plants themselves." (*E.*)

Remarks upon the distilled waters.—By distillation with water many plants communicate their peculiar odour and flavour to the distilled fluid. These generally depend upon a volatile oil, or some other volatile fluid, which is dissolved by the water at the temperature of ebullition, and is retained when cold. It is to be noticed that the London distilled waters now contain no spirit, though they used to do so formerly. The Ed. and Dub. waters on the contrary still contain a portion of spirit.

When long kept, and in some cases very soon after their preparation, they become ropy and sour. This is owing to the development of confervære, one of the lowest forms of vegetable growth, of which a great variety are formed in bodies of vegetable origin, such as the distilled waters now under consideration: the mould upon preserves or sour paste is another illustration of the same kind of growth, and in this case also many different forms may be observed by the microscope as well as by the naked eye. The addition of a small quantity of spirit is intended to prevent the occurrence of this change; but Mr. Warrington attributes the acidity to this very addition, the alcohol being gradually converted into acetic acid. He kept distilled dill and anise waters, without spirit, for two years in a bottle which was occasionally opened and exposed to the air, and found that no change had taken place; but another portion of the same waters, to which the usual quantity of spirit was added, became acid in the course of a few months.*

Distilled waters are almost exclusively used as vehicles for the administration of more important medicines.

AQUA ANETHI, *L. E.*

DILL WATER.

Take of Bruised dill, one pound and a half.
Water, two gallons.
Let a gallon distil. Or,

Take of Oil of dill, two fluid drachms.
Powdered flint, two drachms.
Distilled water, a gallon.

Rub the oil diligently, first with the flint, and afterwards with the water, and strain the solution.

Ed. Anethum seeds bruised, ℥xviii; Water cong. ii; Sp. rect. f℥iii. Mix, and distil one gallon.

Remarks.—Dill water is only used as a carminative for children. It does not possess any properties which distinguish it from the carminative umbelliferæ generally.

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* Proceedings of the Chem. Soc. extracted by the Pharm. Journ. June, 1845.

Dose.—A few drops alone for an infant, or fʒj to f℥iv as a vehicle for some other medicines.

AQUA ANISI, *D.*

ANISEED WATER.

Take of Essence of anise, one fluid ounce.
Distilled water, half a gallon.
Mix, with agitation, and filter through paper.

Properties and dose.—Carminative. fʒj to f℥j, or f℥ij.

Aq. Carui; Cinnamomi; Fœniculi; Menthæ Piperitæ; Menth. Pulegii; Menth. Virid.; and Pimentæ, are prepared like Aq. Anisi, in the Dublin Pharmacopœia.

AQUA AURANTII FLORIS, *L. E.*

Synonyme. Aurantii Aqua, *E.*

ORANGE FLOWER WATER.

This is placed in the Materia Medica, being manufactured on a large scale by the distillation of orange flowers in water.

Uses.—Only for the sake of its odour.

Test.—It is not coloured by hydrosulphuric acid.

Orange water sometimes contains free acetic acid, derived from the flowers. If kept in a copper vessel, or distilled through a copper worm, it is liable to become slightly impregnated with copper; in which case, it would be coloured by hydrosulphuric acid.

AQUA CARUI, *L.D.*

CARAWAY WATER.

Is to be prepared like Aq. Anethi, *L.* (Aq. Anisi, *D.*)

Remarks.—*Aromatic; carminative.* Chiefly used as a vehicle for other medicines, as magnesia, in the flatulent colic of children.

Dose, fʒj to f℥ij.

AQUA CASSIÆ, *E.*

CASSIA WATER.

Take of Cassia bark, bruised, eighteen ounces.
Water, two gallons.
Rectified spirit, three fluid ounces.
Mix, and distil off one gallon.

Remarks.—It is only used as a vehicle, for the sake of its flavour.

AQUA CINNAMOMI, *L. D. E.*

CINNAMON WATER.

It is to be prepared like Aq. Anethi, *L.* (Aq. Cassiæ, *E.*, Aq. Anisi, *D.*)

Remarks.— It is only used as a vehicle, on account of its flavour.

AQUA FŒNICULI, *D. E.*

FENNEL WATER.

It is to be prepared with fennel, like Aqua Anethi, *E.*, Aq. Anisi, *D.*

Remarks.—*Aromatic; carminative.* Used in the same doses and for the same purposes as dill water. Its flavour is not so agreeable as that of caraway or dill.

AQUA LAUROCERASI, *E. D.*

LAUREL (CHERRY) WATER.

D. Fresh leaves of common laurel lbj, water Oiiss. Upon the leaves chopped and crushed in a mortar, macerate the water for 24 hours, and then distil one pint. Filter the product through paper.

E. Take of Fresh leaves of cherry-laurel, one pound.
Water, two pints and a half.
Compound spirit of lavender, an ounce.
Chop down the leaves, mix them with the water, distil off one pint; agitate the distilled liquid well; filter it, if any milkiness remain after a few seconds of rest, and then add the lavender spirit.

Remarks.—The lavender gives a colour which prevents this from being mistaken for common water. The preparation is liable to vary in strength from keeping, and the dose is very uncertain. From ʒss or ʒj, to above ℥j, have been given, several times, daily. It is very seldom used in medicine, but is employed by cooks to flavour blancmange, &c. It may be used in the cases requiring prussic acid, which see. One or two cases of poisoning have occurred from the use of this water in doses not exceeding those which are sometimes administered with safety.

LAUROCER′ASUS (PRUNUS), Common or Cherry-Laurel (Icosandria Monogynia; Amygdaleæ).

Description.— The leaves have no odour until they are bruised, when they evolve the smell of prussic acid or bitter almonds.

Composition.— When distilled with water a volatile oil is obtained in which hydrocaynic acid has been detected; but it is doubtful whether this oil exists prior to the application of the heat, or whether it is not produced by a change in the ingredients of the leaves under the influence of a high temperature.

Medicinal properties and uses.— *Sedative and narcotic*, and in large doses, poisonous. The leaves owe their properties to the prussic acid obtained from them, and the properties and uses are the same as those of that acid. Fatal accidents have arisen from the use of laurel water in sweetmeats.

AQUA MENTHÆ PIPERITÆ, *L. D. E.*

Peppermint Water.

Take of Peppermint, dried, two pounds.
Water, two gallons.

Let a gallon distil. If the fresh herb has been employed, twice the weight must be used.

This water can be more quickly prepared from oil of peppermint, like Aqua Anethi.

E. This distilled water is prepared as Aq. Menth. Viridis. *D.* like Aq. Anisi.

Remarks.— All the mints are *stimulant*, *aromatic*, and *carminative*, and are used to relieve flatulence and griping, or to cover the taste of other medicines. They all contain volatile oil, to which they owe their value; and tannic acid, which causes a green colour with salts of iron.

Properties.— Peppermint water is the most powerful and agreeable of all the mint waters.

AQUA MENTHÆ PULEGII, *D.* See Aqua Pulegii, p. 222.

Prepared like Aq. Anisi.

AQUA MENTHÆ VIRIDIS, *L.D.E.*

SPEARMINT WATER.

Synonyme. Aqua Menthæ Sativæ.

This is prepared in the same manner as Peppermint Water (like Aq. Anisi, *D.*).

E. Spearmint if fresh lb. iv, if dry lb. ij, Water cong. ii., Rect. sp. f℥iii. Mix, and distil one gallon.

Properties.—It is feebler than peppermint, with which it agrees in general characters. It is supposed to be also *emmenagogue*, and is thought to check the secretion of milk.

AQUA PICIS LIQUIDÆ. (Not Off.)

TAR WATER. (Ph. D. 1826.)

Take of Tar (*Wood*), thirty-two fluid ounces.
Water, a gallon.

Stir them together with a stick for a quarter of an hour; then, when the tar has subsided, strain the liquor, and keep it in well-stopped bottles.

Dose.—A teacupful to half a pint two or three times a day.

Properties and uses.—See PIX LIQUIDA, p. 239.

AQUA PIMENTÆ, *L.D.E.*

PIMENTA WATER.

Take of Pimenta, bruised, one pound.
Water, two gallons.

Mix, and distil one gallon. May be prepared like Aq. Anethi, *L.* (like Aq. Anisi, *D.*)

E. Pimenta bruised lb. j, Water cong. ii, Sp. rect. f℥iii. Mix, and distil one gallon.

It is *carminative*, and is used as a vehicle on account of its flavour.

AQUA PULEGII, *L. D. E.*

PENNYROYAL WATER.

Synonyme. Aqua Menthæ Pulegii, *Dub.*

It is prepared like Aq. Menthæ Piperitæ, *L.* (like Aq. Anisi, *D.*; like Aq. Menth. Viridis, *E.*)

Properties.— It is supposed to be *emmenagogue* and *antispasmodic*, in addition to being *carminative*. It is popularly employed in obstructed menstruation, hysteria, and hooping cough.

AQUA ROSÆ, *L. D. E.*

Rose Water.

Take of Cabbage (hundred-leaved) rose petals, ten pounds.
Water, two gallons.
Mix, and let one gallon distil.

E. Petals of rosa centifol. lb. x, Water cong. ii, Sp. rect. f℥iii. Mix, and distil one gallon.

The petals should be preferred when fresh; but it also answers well to use those which have been preserved, by beating them with twice their weight of muriate of soda.

D. Take of essential oil of roses, ♏xx; distilled water, half a gallon. Mix, with agitation, and filter through paper.

ROSA CENTIFOLIA, Hundred-leaved (Cabbage) Rose (Icosandria Polygynia; Rosaceæ).

Description.— It is neither easy nor of consequence to describe this rose, which is commonly cultivated in gardens. It resembles the damask rose, but it is not the same species, though it is sometimes translated as being so, and is so called in the Ph. Ed. The petals are more numerous, and of a deeper colour, than those of the Gallic and Dog roses.

Medicinal properties.— Rose water is much used as a solvent for astringent salts, as sulphate of zinc, when employed as collyria; and it is itself a valuable application in chronic injection of the conjunctiva, unaccompanied by any active inflammation.

Officinal preparations.— Aqua Rosæ. Syrup. Rosæ Centifol.

ROSA CANINA, Dog Rose (Icosandria Polygynia; Rosaceæ).

Description.—The flowers of this species differ from those of the R. centifolia and R. Gallica, in being single instead of double. The fruit, or *hip*, is oblong, pulpy, of a red colour, and contains many small seeds, which are covered with a short down.

Off. preparations.— Conf. Rosæ Caninæ.

ROSA GALLICA, Red or Gallic Rose (Icosandria Polygynia; Rosaceæ).

Description.—The Red Rose is distinguished from the Dog Rose (A. canina) by being double, and from the Cabbage or Hundred-leaved Rose (A. centifolia) by having a pale red colour. It is also characterised by containing a good deal of *tannin.*

Officinal preparations.—Conf. Rosæ. Infus. Rosæ co. Mel Rosæ (Syrup. Rosæ Gall. *E.* and *D.*).

AQUA SAMBUCI, *L. E.*

Elder Water.

Substitute elder flowers for rose leaves, and proceed as for rose water.

Remarks.—*Elder flowers* yield by distillation a small quantity of concrete volatile oil, which, according to Pereira, possesses no useful properties. It imparts flavour to the distilled water, for the sake of which alone the water is used.

SAMBUCUS NIGRA, Elder (Caprifoliaceæ, Pentandria, Trigynia).

The *berries* are extensively made into a kind of wine, which is supposed to be *sudorific*, and is in popular use at the commencement of a catarrh, to check its further progress.

The *inner bark, and probably the leaves, are hydragogue, cathartic, and emetic.* They act with some violence. It is rather remarkable that the active parts of the plant should be the only ones which are not retained in the Pharmacopœia; as neither the bark, the leaves, nor the fruit are officinal. The juice of the fresh root has been employed by M. Vanoye "successfully in some cases in which other diuretics have failed." It sometimes causes vomiting, when it should be discontinued for a time. Its action is not increased by the addition of purgatives, or other diuretics.

Dose.—Of the *juice of the root* ℥ss. at a time, until the whole quantity amounts to ℥v or ℥vj. Of the *bark of the stem* (℥i boiled in water down to a pint) f℥iv repeatedly.

CATAPLASMATA.

POULTICES.

CATAPLASMA CARBONIS, *L.*

CHARCOAL POULTICE.

Take of Boiling water, ten fluid ounces.
Bread, two ounces.
Linseed powdered, ten drachms.
Powdered (animal) charcoal, three drachms.

Macerate the bread for a short time in the water, near the fire; then mix, and add the linseed by degrees; stirring it so as to make a soft poultice. Mix two drachms of the charcoal with this, and sprinkle the remainder on the surface.

Remarks.— It is not specified by the College, that *animal* charcoal is to be employed, but it is of consequence to attend to this point, as common wood charcoal is almost useless. The proportion of charcoal may also be increased with advantage. This is a most valuable poultice for removing the smell from sloughing or unhealthy sores. It is difficult to speak too highly in its praise in this respect. It should be changed two or three times a day at least; oftener, if the smell is very offensive.

Peat charcoal may be used instead of animal charcoal, and it is very efficient in removing the smell. In some cases, especially when there is incontinence of urine, great relief is obtained by stuffing a pillow loosely with finely powdered peat charcoal, and laying it under the patient. It absorbs the urine as it dribbles away, prevents the smell, and materially increases the patient's comfort. It must be changed when it becomes offensive, but it will sometimes answer for a couple of days without being changed.

CATAPLASMA CONII, *L.*

HEMLOCK POULTICE.

Take of Extract of hemlock, one ounce.
Boiling water, ten fluid ounces.
Linseed, bruised, four ounces and a half, or as much as may be sufficient.

Add the linseed, by degrees, to the water, diligently stirring, so as to make a poultice; over this spread the extract, first softened in water.

Medicinal uses.—This has been employed to irritable sores, scrofulous glandular swellings, and open cancers.

CATAPLASMA CYMINI, *Guy's Ph.* (Not Officinal.)

Cumin Poultice.

Take of Cumin seeds (fruit), half a pound.
Laurel berries, an ounce and a half.
Dried wormwood, three ounces.
Pimenta berries, half an ounce.

Rub all together into a powder, and having added three times their weight of treacle, let a poultice be made.

Remarks.—There is no officinal preparation of cumin. The above formula corresponds with one which was in the London Pharmacopœia of 1745.

It is frequently used in Guy's Hospital as a stimulating poultice to painful sloughing sores, and is employed in nearly the same cases as those for which the yest poultice is intended.

CATAPLASMA DAUCI.

Carrot Poultice. (Not Officinal.)

Take of Carrot roots, any quantity.

Boil them until they are soft, and then beat them into a pulp.

The poultice, formed of the boiled roots, is stimulant, and is applied to unhealthy, fœtid, spreading ulcers.

Properties.—Carrot seeds have been used in suppressions of urine and difficult micturition, but they are now scarcely ever employed.

CATAPLASMA FERMENTI, *L.*

Yest Poultice.

Take of Yest,
Water heated to 100°, of each, five fluid ounces.
Flour, a pound.

Mix the yest with the water, and add the flour; stirring it, to make a poultice. Put this down upon the hearth until it swells up.

Remarks.— This poultice is liable to be very uncomfortable and even painful to the patient; for when fermentation commences, the bulk of the poultice is so much increased that it escapes from under the cloths used to retain it in its position, and a quantity of half fluid flour and yest is forced out, and dries upon the patient's skin. I have not succeeded in remedying this objection, by varying the proportions of the prescribed ingredients.

Medicinal properties and uses.— It is intended as an application to foul and painful sores, to allay the pain, and promote the separation of the sloughs. Its efficacy is supposed to depend upon the anodine properties of the carbonic acid evolved during fermentation. It should, therefore, be changed two or three times daily.

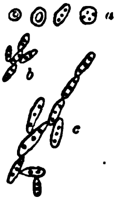
YEST OR BARM.

Description.—This is a peculiar substance, which forms in considerable quantity during the fermentation of saccharine matters. It possesses the property of exciting fermentation when added in small quantities to saccharine compounds, which are not previously undergoing any change. The phenomena that accompany its operation are, a considerable increase of heat; the evolution of a large quantity of carbonic acid gas, occasioning great agitation ("working") in the solution; the conversion of the saccharine constituents into alcohol; and the abundant formation of a substance resembling itself, and capable, as before, of exciting a similar action in fresh materials.

The nature of this agent, and the explanation of the changes which it produces, have long been subjects of great uncertainty and difficulty; and they are still far from settled.

Two theories, totally differing from each other, have been proposed, to account for them.

Organic theory.—It is found, when examined under the microscope, that yest consists of a number of vesicles, *a*, containing one or more granules within each. These vesicles increase by the development, from various parts, of fresh buds or vesicles, *b*, and they ultimately assume a variety of forms, *b*, *c*.



The vesicles are supposed to be minute vegetable bodies of the lowest scale of development, which grow at the expense of nitrogenized matter, which is associated with the saccharine fluid. This yest plant contains nitrogen, which in some form is necessary for its growth. Pure sugar contains none, and yest will not increase when put into solution of pure sugar; but in the juice of the grape, which ferments naturally, and in malt and other bodies which are capable of being fermented, some substance of a glutinous nature, and containing nitrogen, is always present. It is at the expense of this azotized body that the yest grows, and as soon as it is expended the fermentation or increase of the yest ceases spontaneously. But whilst this change is going on the saccharine ingredients present are decomposed and converted into alcohol and carbonic acid. The yest plant is called *Torula cerevisiæ* by Mr. Turpin, and when examined under the microscope corresponds remarkably with the "*vinegar plant*" which is sometimes used to excite the acetous fermentation; the only difference between them appears to be, that the little cells are more closely and firmly united in the vinegar plant than in the torula. The more frequently this growth is examined and compared with other low forms of cellular plants, the more is the conviction of its vegetable nature confirmed: but I have never seen it present the lengthened cells and the exact appearance represented at *c*, the cells having always been round or nearly so, as shown at *a*, though united together so as to form lengthened strings of cells.

The following diagram illustrates the changes during the conversion of sugar into alcohol.

	C.	H.	O.	
1 eq. of sugar contains - - -	6	6	6	(*Prout.*)
2 eqs. of alcohol - - - -	4	6	2	
2 eqs. of carbonic acid - - -	2	0	4	

Thus, the abstraction of carbonic acid from sugar leaves alcohol.

Catalytic theory. — To the above theory the following objections have been made: —

1st. When solution of *pure* sugar is fermented, the quantity of yest gradually diminishes, and fermentation soon ceases, and it is only when *gluten* is present, as in wort, that its quantity increases.

2nd. Yest is a product of the decomposition of *gluten* (*Graham*).

According to the catalytic theory, bodies which are in a state of decomposition or change, are capable of exciting a change in the constitution of compounds with which they come in contact. Yest is a body in such a state of change; and when added to a solution containing sugar and gluten, it causes the decomposition of the latter, and the recombination of the elements of sugar in the shape of alcohol and carbonic acid; the change in the gluten converting it into yest; and thus the evolution of carbonic acid, and at the same time the increase of the yest, are accounted for.

Medicinal uses of Yest. — This substance is not often given internally. It is, however, very beneficially employed in the *low petechial form of typhus*, which frequently occurs in Dublin and elsewhere. Dr. Stoker says that he has administered it in several thousand cases of fever in the Fever Hospital in Dublin. It is most useful when there is extreme prostration, and tendency to gangrene. In these cases it may be given along with bark, or may be substituted for it, when bark is contra-indicated by the symptoms. He says it generally acts as a slight aperient, and renders the employment of purgatives unnecessary. It may require the addition of a few drops of laudanum; or, if not sufficiently active, a few grains of jalap may be combined with it. The morbid contents of the bowels, the petechiæ, and the black loaded tongue, are more effectually relieved by it than by any other remedy. It is generally agreeable to the patient; is retained on the stomach, if it can retain anything; and never causes flatulence. It may be given in enemata combined with assafœtida, to relieve typhoid tympanitis.[*]

The dose is ℥ss, every three hours, in camphor mixture; or three times this quantity as an enema.

My own experience confirms its utility, but not in the above glowing terms, as I have found it often unpalatable, and have had to discontinue it from its causing so much flatulence. Still it is a valuable remedy in these low forms of fever.

CATAPLASMA LINI, *L.*

LINSEED POULTICE.

Take of Boiling water, ten fluid ounces.
Linseed, powdered, four ounces and a half, or as much as may be sufficient.

Add the linseed to the water by degrees, constantly stirring, that a poultice may be made.

Description.—Linseeds are brown and smooth externally, pointed at each end, and from a quarter to three-eighths of an inch in length.

Seeds for which they may be mistaken.—There is no officinal seed for which they can be mistaken; but they somewhat resemble the seeds sold as "cress" by seedsmen, which are usually sown with mustard for early salad. They are distinguished by being larger than the cress seeds.

LINI FARINA, LINSEED MEAL, *E.*

Remarks.—The powdered linseed ordered in the Ph. L. is better, when it can be obtained, than the linseed meal which is generally used. The powdered seeds contain a large quantity of fixed oil, which makes the poultice more emollient. When the oil is expressed, the remains of the seeds are formed into a flat cake, employed under the name of "linseed cake," for fattening sheep, and which, when ground, constitutes linseed meal. In making this poultice, it is very important that the water should be boiling, and added to the meal in small quantities at a time, being well *beaten* up with each addition. The addition of a small quantity of lard or spermaceti ointment is a great improvement, if the meal is used. It supplies the place of the oil, and prevents the edges of the poultice from becoming hard, and sticking to the skin; which is a matter of no small consequence, especially with infants or children.

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[*] Stoker on Continued Fever, Dublin, 1829, p. 121, *et seq.*

CATAPLASMA SINAPIS, *L.*

MUSTARD POULTICE.

Take of Boiling water, ten fluid ounces.
Powdered linseed,
Mustard seed, powdered, of each, two ounces and a half, or as much as may be sufficient.

Add the powders, first mixed together, to the water by degrees, stirring them so as to make a poultice.

SINAPIS NIGRA ET S. ALBA (Tetradynamia Siliquosa; Cruciferæ).

Description and varieties.—*Black mustard* seeds are very small, round, and of a blackish *brown* colour *externally*, and yellow internally, and may easily be mistaken for colchicum seeds. Their pungency when chewed, at once distinguishes them; and when crushed by the nail, they leave a spot of oil, which is not the case with the colchicum. *White mustard seeds* are three times the size of the last, and are *yellow externally*.

Composition.—BLACK MUSTARD. *Sinapisin*, a white, volatile, crystalline substance. *Fixed oil*, obtained by pressing the coarse siftings from the bruised seeds. *Volatile oil* does not exist naturally in mustard; but is formed under the influence of heat by the mutual action of two principles contained in the seeds: viz. *myrosine* (*emulsin*), and *myronic acid*. When these are heated together, their elements become differently combined, and give rise to the formation of a volatile oil, which is obtained by distillation. (See CONFECT. AMYGDALÆ.) Myronic acid contains sulphur which blackens silver spoons, when left in contact with mustard.

WHITE MUSTARD. *Volatile? acrid principle*, which does not exist originally in the seeds, but is formed under the influence of heat. This principle differs from the volatile oil of black mustard, and there is some doubt as to whether it is an oil or not.

Sulpho-sinapisin.—This does not exist in black mustard. It strikes a deep red colour with sesquichloride of iron. By this means, infusion of white mustard may be distinguished from infusion of black mustard, in which sesquichloride of iron causes merely an orange tint.

Flour of mustard almost invariably consists, according to the Analytical Sanitary Commission, of the mixed seeds of black and white mustard, crushed and sifted, largely mixed with flour, and coloured with turmeric.*

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* Lancet, March 22, 1851.

Medicinal properties.—Acrid stimulant; emetic; diuretic; and *rubefacient.* When taken in moderate quantities, mustard assists digestion, promotes the appetite, and sometimes causes diaphoresis. It also increases the action of the kidneys. Its acrid properties are shown in the flow of tears which it frequently excites, and in the redness and inflammation of the skin which it causes, when locally applied. In large doses it acts as a stimulating emetic. Great caution is necessary in the application of mustard as a counter-irritant, to persons who are comatose, or insensible to pain from any other cause; for, if long retained on the skin, it sometimes occasions deep and very troublesome sloughs. White mustard differs from black, simply in possessing less active properties.

Uses.—As a *condiment.* As an *emetic* in *poisoning* by *narcotics.* Some years since it was fashionable to swallow large quantities of unbruised white mustard seeds, as a remedy in *atonic dyspepsia;* but this practice is now obsolete. The seeds were liable to accumulate in large quantities in the cæcum, and to produce injurious effects. As a *counter-irritant,* mustard poultices are used in various *cerebral affections,* as the *coma* of *typhus,* and in *apoplexy.* They are also of use in some cases of *hysterical pains* (pleurodynia, &c.): and in cases where the operation of cantharides is too slow, or cannot be obtained. The severe pain sometimes remaining after the removal of a mustard poultice may be relieved by dropping ether or cold water upon the inflamed part (*Christison*).

Doses.—As an *emetic,* repeated doses of one or two teaspoonfuls of the powdered mustard, in an ounce of water. For children, one spoonful taken at twice, will generally be sufficient.

It has been used in similar doses, two or three times a day, in *atonic dropsy,* but is now seldom employed. Powdered mustard is often mixed with hot water, and used as a pediluvium, for the relief of coma, or headache, from congestion of the brain in catarrh, &c.

Remarks upon the mustard poultice.—Heat or acids lessen the acridity of mustard, and boiling vinegar, formerly ordered in the Pharmacopœia, was therefore injurious, and is now omitted. The addition of the linseed meal (for which flour may be substituted if more convenient) also weakens its effects. A mustard poultice is most conveniently made by simply spreading the mustard as prepared for dietetical use, upon calico; or a common bread and water poultice may be made, and dry flour of mustard sprinkled upon its surface; both of which are efficient modes of applying it.

As before mentioned, this poultice must not be applied too long. It can seldom be borne more than fifteen or twenty-five minutes; and in young children, five or ten minutes are generally sufficient.

CATAPLASMA SODÆ CHLORINATÆ, *L.*

CHLORIDE OF SODA POULTICE.

Take of Boiling water, six fluid ounces.
Linseed, powdered, four ounces and a half.
Solution of chlorinated soda, two fluid ounces.

Add the linseed by degrees to the water, constantly stirring; then mix the chlorinated soda.

Medicinal properties and uses.— The object of this poultice is to remove the offensive odour from sloughing sores.

CERATES.

CERATES.

Remarks.— Cerates only differ from Ointments in being harder, which is owing to the wax (cera) in their composition, from which they take their name.

CERATUM, *L.*

CERATE.

Synonyme. Ceratum simplex. Soft Dressing.

Take of Olive oil, a pint.
Wax, twenty ounces.
Add the oil to the melted wax, and mix.

Description.— WAX, or BEES' WAX, is too well known to require description. It is a secretion from the ventral scales of the bee, and is not necessarily derived from the pollen of plants (*Bonnet*, *Hunter*, and *Huber*). It is extracted from the comb, by allowing the honey to run out, and then melting the remaining mass. The impurities subside, and the wax is poured into moulds. *White wax* is common yellow wax bleached, which is thus effected. The melted wax is poured into a trough, having its bottom full of holes, through which the wax drops upon a cylinder kept revolving in a trough of water. By this means, the wax is drawn out into long threads, and these are gradually bleached by exposure to the sun and to moisture. This process must generally be repeated three times. Wax is now frequently bleached by means of chlorine.

Properties.— *Yellow wax* should be entirely dissolved by oil of turpentine, and it ought not to feel fatty or greasy. *White wax* is generally sold in cakes, or in candles. It is never perfectly pure in these forms, but always contains spermaceti, which renders it whiter. Both kinds are lighter than water.

Composition.—According to John, wax consists of *cerin* (soluble in boiling alcohol, and converted by caustic potash into margaric acid, and ceraïne), and *myricin*, which is incapable of forming a soap. Hess, however, asserts that these are not distinct principles; but that wax is essentially a proximate principle, consisting of $C^{20} H^{30} O$.

Medicinal properties and uses.— Wax is an *emollient* and *demulcent.* It has been used, when melted and mixed with eggs and mucilage, as an article of diet in *dysentery* and *diarrhœa.* It is now, however, almost exclusively employed as a simple emollient application to wounds or ulcers; and is the basis of all cerates, and many ointments and plasters.

CERATUM CALAMINÆ, *L. E.*

Calamine Cerate.

Synonyme. Ceratum Epuloticum. Ceratum Lapidis Calaminaris. Turner's cerate.

Take of Calamine (prepared),
Wax, of each seven ounces and a half.
Olive oil, a pint.

Mix the oil with the melted wax; then remove them from the fire, and when first they begin to thicken, add the calamine, and stir constantly, until they cool.

E. Calamine, one part; Simple cerate, five parts. Mix.

Medicinal use. — This cerate is used as a dressing to excoriations and ulcers, and to burns after the inflammation has subsided. It is mentioned (see Metallica — Calamina) that the calamine commonly used consists almost entirely of sulphate of barytes, and contains scarcely a trace of carbonate of zinc. It is probable that this acts simply as an absorbent, for no bad effects have ever been mentioned as resulting from this unsuspected employment of a salt of barytes.

CERATUM CANTHARIDIS, *L.*

Cerate of Cantharides.

Synonyme. Unguentum ad vesicatoria. Ceratum Lyttæ.

Take of Cantharides, rubbed to very fine powder, an ounce.
Spermaceti cerate, six ounces.

Add the cantharides to the cerate softened by a fire, and mix.

Medicinal use. — This cerate is employed to promote a discharge from a blistered surface; it sometimes answers the purpose without exciting much irritation; but it often produces swelling of the lymphatics, and general irritation.

It is principally in diseases of the joints that blisters are kept open for a length of time; and the following rule is generally observed in these affections. In chronic affections of the *synovial* *membranes*, indicated by general thickening and effusion into the joint, it is most advisable to apply a *succession* of *blisters*; and these not too near the joint, if it be a superficial one, as the knee. On the other hand, in chronic *ulceration* of *cartilages*, it is most useful to keep *a blister open* for a considerable period, by means of this or savine cerate. In children, long continued counter-irritation is more conveniently and advantageously attained by this means than by the issues which are generally employed for adults.*

In the *coma* of *fever*, this cerate is sometimes mixed with an equal weight of mercurial ointment, and rubbed upon the shaved head, and often produces the desired effect. Its application is not, however, free from danger, as it sometimes produces subsequent sloughing of the scalp.

CERATUM CETACEI, *L.*

SPERMACETI CERATE.

Synonyme. Ceratum album.

Take of Spermaceti, two ounces.
White wax, eight ounces.
Olive oil, a pint.

To the spermaceti and wax, melted together, add the oil, and stir them with a spatula until they cool.

Description.—CETACEUM-SPERMACETI is a solid substance, found in the skull of the sperm whale. The cavities containing it consist of a large number of ligamentous or cellular cells, which are quite distinct from the cranial cavity containing the brain. They are situated on each side of the nostrils, and in the upper part of the head. The finest spermaceti is in the smallest and least ligamentous cells. It is naturally combined with a large quantity of oil (sperm oil), from which it is separated by being put into filtering bags, through which the oil runs spontaneously or is forced out by an hydraulic press. The solid remaining in the bag is then melted in water, and the impurities skimmed off. It is afterwards poured into moulds, allowed to concrete, and constitutes spermaceti.

Properties.—Spermaceti is a white, opaque solid, having a fibrous appearance, and a pearly or satiny lustre. It feels smooth, but scarcely greasy to the touch; is insoluble in water, and only slightly soluble in boiling alcohol, and generally contains a small quantity of sperm oil, which makes it liable to become rancid. It is easily powdered if a few drops of alcohol or almond oil are previously added; and it fuses at a temperature of 112° F.

Composition. — It consists of margaric and oleic acids, and of a principle called ethal, $C^{16} H^{17} O$. When this is distilled with phosphoric acid it yields an oily substance named cetene, $C^{16} H^{16}$.

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* Brodie on Diseases of the Joints.

Medicinal properties and uses. — *Emollient* and *demulcent.* It has been frequently administered internally, in the form of emulsion, made with yolk of egg, in *diarrhœa* and *dysentery*, and in *gastritis.* Its chief use is in the preparation of various cerates and ointments. The spermaceti cerate is a mild unirritating dressing when applied to a blistered surface.

CERATUM HYDRARGYRI COMPOSITUM, *L.*

COMPOUND MERCURIAL CERATE.

Synonyme. Scott's Dressing.

Take of Mercurial ointment (strong),
Compound soap cerate, of each, six ounces.
Camphor, an ounce and a half.
Rub them together.

Remarks. — This is familiarly known as *Scott's dressing*, and is a most valuable application for the removal of the chronic thickening which remains after inflammation of the synovial membrane, or of the tissues surrounding the joints. It is also useful for the dispersion of indolent uninflamed tumours.

It is to be spread *thickly* upon strips of calico or linen, and these are to be applied round the joint, so as to envelop it completely, and cause some degree of pressure. The strips are to be retained in their place by means of a bandage.

CERATUM PLUMBI ACETATIS, *L.*

CERATE OF ACETATE OF LEAD.

Synonyme. Ung. Saturninum. Ung. Cerussæ Acetatis. Cerat. Plumbi Superacetatis.

Take of Acetate of lead, powdered, five drachms.
White wax, five ounces.
Olive oil, a pint.

Dissolve the wax in eighteen fluid ounces of the oil; then to these gradually add the acetate of lead separately rubbed with the rest of the oil, and stir with a spatula until they incorporate.

Medicinal use. — A soothing dressing in cases of burns, excoriations, and irritable ulcers.

CERATUM PLUMBI COMPOSITUM, *L.*

Compound Cerate of Lead.

Synonyme. Cerat. Lithargyri Acetat. Cerat. Plumbi co. Goulard's Cerate.

Take of Solution of diacetate of lead, six fluid ounces.
Wax, eight ounces.
Olive oil, a pint.
Camphor, a drachm.

Mix the melted wax with sixteen fluid ounces of the oil; then remove them from the fire, and, as soon as they begin to thicken, gradually add the solution of diacetate of lead, and stir them constantly with a spatula until they cool; lastly, with these mix the camphor dissolved in the rest of the oil.

Medicinal use. — This is applicable to the same cases as the preceding cerate. "It is stated to be particularly serviceable in chronic ophthalmia of the tarsus, and for the increased secretion of tears, which so frequently affects the eyes of persons advanced in years."

CERATUM RESINÆ, *L.*

Cerate of Resin.

Synonyme. Ceratum Resinæ flavæ. Basilicon Ointment.

Take of Resin,
Wax, of each, fifteen ounces.
Olive oil, a pint.

Melt the resin and wax together, with a slow fire; then add the oil, and press the cerate, while still hot, through a linen cloth.

Common Turpentine (*Terebinthina vulgaris*) is obtained from the Pinus sylvestris and some other species, by cutting a hole in the trunk of the tree, and removing the bark around it. The juice which flows into this hole is common turpentine.

Description. — Semi-liquid in warm weather, solid in cold weather; sticky and capable of being drawn out; having a yellow colour, and a peculiar (terebinthinate) odour.

Composition. — *Volatile oil* (oleum terebinthinæ) and *resin* (common rosin).

CANADIAN TURPENTINE (BALSAM), *Terebinthina Canadensis*, is obtained from the Pinus balsamea (*Abies*). It exudes spontaneously between the wood and bark, forming vesicles from which the turpentine flows when they are tapped.

Description. — Resembles common turpentine, but is more transparent, of a brighter yellow colour, and differs somewhat in odour.

Composition. — *Volatile oil* and *resin.*

CHIO TURPENTINE, *Terebinthina Chia*, is obtained from the Pistachia terebinthus by making incisions into the trunk of the tree, from which the turpentine runs out. This kind is very scarce, and is little used.

Description. — It cannot be distinguished, by means of description, from Canada balsam.

Composition. — *Volatile oil* and *resin.*

VENICE TURPENTINE is not in the London Pharmacopœia; and what is commonly sold as such is a fictitious compound of oil of turpentine and black rosin.

Properties. — All the turpentines agree in general properties. They are soft or semi-liquid at ordinary temperatures when fresh, but soon become hard by the volatilisation of part of the oil, and the conversion of the remainder into resin. They yield a volatile oil when submitted to heat, and resin remains behind. They burn with a bright flame, and much smoke.

Medicinal properties. — All the turpentines are *stimulant* when taken internally, and excite the action of the kidneys, and of the skin and mucous membranes. They appear to possess a peculiar effect upon the capillaries, as they suppress passive hæmorrhages from the mucous membranes, and check excessive mucous secretions. Applied to the skin they act as *rubefacients.*

Uses. — The volatile oil is much used in medicine. (See OLEUM TEREBINTHINÆ PURIFICATUM.) The turpentines were formerly employed internally, to check gonorrhœa and other mucous discharges, but they are seldom used in this way at present; though Canada turpentine is still sometimes administered; and Chio turpentine is frequently employed by Mr. Green in gleet and chronic gonorrhœa. They are principally used as stimulating applications to indolent ulcers, with large flabby granulations. If there is a *deficiency* of *secretion* in such ulcers, Mr. Key finds that the vegetable (terebinthinate) stimulants act the most favourably: if there is *too great* a secretion, he finds the most advantage from the use of the metallic astringents, as sulphate of zinc, &c. (*MS. Lectures.*)

They enter into the composition of various stimulating ointments and plasters.

RESINA (resin, rosin) is the solid residuum left after the distillation of the oil from common turpentine. It is too well known to require description. It is never employed internally, and its external uses are similar to those mentioned under the Turpentines. Cobbler's wax, which is a compound of pitch, resin, and tallow, is a popular application to promote the suppuration of boils, and well deserves the reputation which it possesses in these cases. It shields the boil from pressure, and certainly does considerably relieve the severe pain which always accompanies them.

Pix liquida (tar, liquid pitch) is obtained from the Pinus sylvestris. The branches are cut off and arranged in the form of a pile in a pit dug in the earth. This pile is covered with sods and earth, so as to leave a very small supply of air, and is then set on fire. The tar is expelled from the wood by the heat, and runs down to the bottom of the pit, where it collects. It is formed in large quantities in the process of making coal gas, but it is important to make a distinction between them in prescriptions, as the creasote and other compounds present in wood tar are not found in a corresponding manner in coal tar.

Description. — It is a dark brown liquid, which retains its fluidity for a great length of time, even when exposed to the air.

Composition. — *Black resin, acetic acid, modified oil of turpentine,* and sometimes *creasote;* and a variety of pyrogenous liquid compounds.

Properties and uses.—*Stimulant; diaphoretic;* and *diuretic.* It is seldom employed internally. It has, however, been very beneficially used in *lepra* and *psoriasis,* both internally and externally. The inhalation of its vapour has been strongly recommended in *phthysis,* but is now seldom or never practised. The ointment is a valuable application to indolent ulcers, and to lepra, psoriasis, and ringworm. It excites excessive itching when rubbed upon the scalp for lepra in this situation.

Tar water (*Aqua Picis Liquidæ*) at one time possessed a high reputation for the cure of *phthysis;* and although it has fallen into great neglect, probably in consequence of its former exaggerated praises, it is a remedy of considerable value, both in that disease and in other forms of scrofula. Dr. Copland speaks strongly in favour of both tar and tar water as local and constitutional remedies in scrofula; and Dr. Turnbull has recently published the results of his experiments upon tar water in phthysis.* They confirm the old opinions as to its possessing considerable efficacy in the alleviation, at any rate, of this disease: in many cases it abates the profuse secretion of mucus and the night-sweats, and thereby saves the strength of the patient, and materially promotes his comfort. But its chief value, according to Dr. Turnbull, resides in its power of removing the irritability of the stomach, which is frequently met with, and which prevents the retention of cod liver oil upon the stomach, and interferes with the proper assimilation of food. "No remedies have appeared to me to succeed so well as tar water. I am anxious, however, to produce no undue impression as to its beneficial properties; and I therefore repeat that I recommend it more particularly for the sickness and vomiting with irritability of the stomach so common in this disease, which causes cod liver oil to rise or be rejected, and prevents the patient from taking a sufficient quantity of food."

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* Report on the Progress of Improvement in the Treatment of Consumption: Churchill, 1853.

Composition.— Tar water is a solution of variable strength of pyroligneous acid, creasote, pyroxilic spirit, acetone, and other similar substances contained in the tar from which it is made.

Dose.—A teacupful to half a pint two or three times a day. The patient soon becomes reconciled to its flavour, which is at first disagreeable.

PITCH is the solid residue, when tar is boiled to dryness. Its properties and uses are precisely similar to those of Tar. It is beneficially used both internally and externally in some obstinate cases of *lepra* and *psoriasis*, and is highly spoken of as affording great relief in cases of *piles*, either dry or bleeding. The dose is gr. x to gr. xv, every night.

Dose.— Of pitch or tar gr. x to ℈j, twice or three times daily; made into pills with half its weight of gum acacia.

CERATUM SABINÆ, *E.*

SAVINE CERATE.

Synonyme. Unguentum Sabinæ, *Ph. L.*

Take of fresh Savine, two parts.
Bees' wax, one part.
Axunge (lard), four parts.

Melt the wax and axunge together, add the savine, and boil them together till the leaves are friable; then strain.

JUNIPERUS SABINA (Diœcia Monadelphia; Coniferæ).

Description.— Savine tops are the extreme branches, upon which the small four-sided leaves are so closely clustered, as to make them appear like green leafless sticks.

Remarks upon the Ceratum Sabinæ. — This ought to have a fresh green colour, and the odour should not be acid or offensive. When applied to an ulcer or wound, it causes irritation, and increased suppuration, and prevents its healing. It is used, on this account, when it is desirable to keep a suppurating surface open. It is preferable to the ceratum cantharidis, as it occasions no strangury, and is generally equally efficacious in maintaining a suppurating sore.

Composition.— Savine leaves contain a *volatile oil*, which is the active principle.

CERATUM SAPONIS COMPOSITUM, *L.*

Soap Cerate.

Synonyme. Ceratum Saponis, *Ph. L.* 1836.

Take of Soap, ten ounces.
Wax, twelve ounces and a half.
Oxide of lead, powdered, fifteen ounces.
Olive oil, a pint.
Vinegar, a gallon.

Boil the vinegar with the oxide, over a slow fire, constantly stirring them until they incorporate; then add the soap, and boil again in like manner, until all the moisture is evaporated; lastly, with these mix the wax, first dissolved in the oil.

Uses. — This cerate is sometimes applied as a cooling dressing. It is however much more frequently used, when spread upon calico, as a smooth mechanical support to fractured limbs, before the splints are applied, to prevent them from chafing the skin.

CERATUM SIMPLEX, *E.*

Simple Cerate.

Take of olive oil six parts, white wax three parts, spermaceti one part. Melt.

CONFECTIONES.

CONFECTIONS (CONSERVES AND ELECTUARIES, *E.*).

Remarks.—This class of compounds was formerly termed Electuaries, and the name is still retained in the Ph. Ed. As the compounds contain a considerable proportion of sugar, they soon spoil if not kept dry. They seldom possess any very active properties.

CONFECTIO AMYGDALÆ, *L. E.*

CONFECTION OF ALMOND.

Synonyme. Conserva Amygdalarum, *E.* Confectio Amygdalarum.

Take of Sweet almonds, eight ounces.
Acacia, powdered, an ounce.
White sugar, four ounces.

Pound the almonds, first macerated in cold water, and deprived of their skins, and rub them through a fine wire sieve; then, having added the other ingredients, beat them all together until they form a uniform substance.

This confection may be kept unchanged longer, if the almonds, first peeled, dried, and rubbed into a very fine powder, are mixed with the acacia and sugar separately powdered; and the mixed powder is kept in a well closed vessel.

AMYGDALA (Icosandria Monogynia; Amygdaleæ).

Description and varieties. — The bitter almond resembles the sweet almond in general appearance, but it is somewhat smaller. Both kinds yield a fixed oil when subjected to pressure, but the bitter variety is generally employed for this purpose, as it is less expensive.

SWEET ALMONDS are principally used for making the confection and for desserts. The outer brown covering is easily separated when they are soaked in warm water, and the almond is then called "blanched." They are nutritious, but liable to disorder the stomach, from the large quantity of fixed oil which they contain.

The husk, when eaten, sometimes produces swelling of the face and nettle-rash.

Bitter Almonds are characterised by their bitter flavour, and by the peculiar odour emitted when rubbed with a little water. They are poisonous when eaten, producing disordered digestion, nausea, vomiting, purging, and death, sometimes preceded by convulsions; the symptoms somewhat resembling those occasioned by hydrocyanic acid.

Fixed oil of almonds.—This is chiefly obtained from the bitter almond, by expression, and does not possess any poisonous properties. It is simply *nutrient* and *emollient*, or, in large doses, *laxative*. After the oil has been expressed, the "cake" which remains is subjected to heat, and a volatile oil is distilled. The remainder of the "cake" is then used for fattening pigs.

Volatile oil of almonds. — This oil is highly poisonous. It has the odour and flavour of hydrocyanic acid, and is about four times the strength of the officinal acid. Its production is very curious, as it does not exist in the almond cake before being submitted to heat. The bitter almond contains two principles: *emulsin*, which exists also in the sweet almond, and is soluble in water, forming an emulsion; and *amygdalin*, which does not exist in the sweet variety. Amygdalin contains the elements for forming the volatile oil, hydrocyanic acid, formic acid, sugar, and water; and when heated along with emulsin and water, it is decomposed, and these compounds are formed; though, when heated alone, it does not yield these products. The emulsin does not itself contribute to their formation, but appears to possess the power (catalytic) of inducing the necessary changes in the amygdalin, acting like yest or some ferment.*

Dose.—Of the confection ʒi to ʒii or ʒiii; of the *fixed oil*, fʒss to fʒi as a laxative for infants, for whom chiefly it is used; of the *volatile oil*, gtt. ¼ to gtt. 1, as it is about four times the strength of the pharmacopœial Acid. Hydrocyan. dil. There is, however, nothing to recommend it, whilst its variable strength is an objection.

Dr. Douglas Maclagan has shown (Month. Journ. Med. Soc., Jan. 1854) that this oil, when carefully rectified and freed from hydrocyanic acid, is not poisonous to animals generally, and that even ʒss may be given to rabbits without producing injurious effects. As the oil can be freed from that acid by shaking it with quick lime and protosulphate of iron (Mitcherlich, Pharm. Journ. vol. x. p. 83.), and afterwards distilling it, there is no excuse for any accident which may arise from the sale of unrectified oil for purposes of cookery. Dr. Maclagan's experiments were undertaken to settle the question whether the volatile oil of almonds, thus purified from hydrocyanic acid, is really poisonous or not, and Dr. Maclagan considers the point to be decided in the negative — *i. e.* when properly purified it is not poisonous.

Properties and uses. — The fixed oil is sometimes used as a *laxative* for *infants*, mixed with as much syrup of roses or of violets; and it is also employed, when mixed with confection of dog rose and syrup of poppy, as a linctus to allay troublesome cough. The volatile oil is seldom used medicinally, but is much employed, under the name of *essence of almonds*, by cooks and confectioners, for imparting an agreeable flavour to viands. The confection is only used for the preparation of the almond mixture. It is liable to spoil if mixed with water, and the ingredients are therefore now directed to be kept dry, and to be mixed only when required for use.

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* Wöhler and Liebig.

CONFECTIO AROMATICA, *L. D. E.*

Aromatic Confection.

Synonyme. Electuarium Aromaticum, *E.* Confectio Raleighana. Confectio Cardiaca.

Take of Cinnamon,
Nutmegs, each, two ounces.
Cloves, an ounce.
Cardamoms (husked), half an ounce.
Saffron, two ounces.
Prepared chalk, sixteen ounces.
Sugar, two pounds.
Distilled water, as much as sufficient.

Rub the dry ingredients together to a very fine powder, and keep them in a close vessel; and whenever the confection is to be used, add two fluid drachms of the water to each ounce of the powder, and mix them all until they are incorporated.

D. Aromatic powder, ℥v; Saffron (in powder), ℥ss; Oil of cloves, fʒss; Simple syrup, f℥v; Clarified honey, *by weight*, ℥ij.
E. Aromatic powder, 1 part; Syrup of orange peel, 2 parts.

Remarks.—This confection is liable to ferment if kept moist, on which account it is ordered to be mixed with water only when required for use.

Properties and uses.—*Stimulant; cordial; antacid; and astringent.* The chalk is the chief astringent ingredient, but the cinnamon also possesses this property. It is frequently added to common chalk mixture to restrain diarrhœa, and is employed in other cases in which spices are indicated.

Incompatibles.—Acids, and acidulous and metallic salts. The carbonate of lime present would precipitate a carbonate of the bases of these salts.

Dose.—Gr. x to [illegible]

CONFECTIO AURANTII, *L.E.*

Confection of Orange (Peel).

Synonyme. Conserva Aurantii, *E.* Confectio Aurantiorum.

Take of (Bitter, *E.*) orange peel, fresh, separated by a rasp, a pound.
Sugar, three pounds.

Pound the peel in a stone mortar with a wooden pestle; then, the sugar being added, again pound until incorporated.

Remarks.—An officinal form of Scotch marmalade.

CONFECTIO CASSIÆ, *L.*

Confection of Cassia.

Synonyme. Electuarium Cassiæ.

Take of Prepared cassia (pulp), half a pound.
Manna, two ounces.
Prepared tamarind (pulp), an ounce.
Syrup of roses, eight fluid ounces.

Bruise the manna, then dissolve it in the syrup; afterwards mix in the cassia and tamarind (pulps), and evaporate the moisture until a proper consistence is attained.

Medicinal use.—Purgative, in doses of ʒij to ℥j. It is only used for children, as it is liable to cause nausea and griping in adults.

CASSIA, Cassia Fistula (Decandria Monogynia; Leguminosæ, sub ord. Cæsalpineæ).

Description.—Cassia is the pulp obtained by washing the pods of the Cassia fistula with hot water, and straining off the water.

The pods are from 1 to 3 feet in length, roundish, tapering at each extremity, and of a brownish-black colour; they contain numerous flat seeds, which are separated from each other by pulpy transverse septa; and it is these septa which constitute cassia pulp.

Composition.—Peculiar kind of *sugar* and *gum.*

Medicinal properties.—In *small* doses, *laxative;* in *large* ones, *purgative.* It is apt to cause nausea, flatulence, and griping. It is never prescribed alone, and the addition of the manna is said to increase its powers many-fold. It has a sweet taste, which children do not dislike, and it is therefore a convenient purgative for them. It may be given in enteritis, as it does not tend to cause inflammation.

Characteristics as a purgative. — Mild; sickly; griping; sweet taste; ineffectual, if given alone; does not cause inflammatory action of the alimentary mucous membrane.

Dose. — As a laxative, ʒj to ʒij; as a purgative, ℥j to ℥ij.

MANNA, Fraxinus Rotundifolia (Diandria Monogynia; Oleaceæ).

Description. — Manna is obtained from various species of Fraxinus, by making incisions into the lower part of the tree, from which a juice exudes and concretes into manna. This substance is in small flakes of various sizes, which have a white or yellow colour; and a sweet sickly taste.

Composition. — *Mannite* (peculiar kind of sugar).

Medicinal properties. — *Nutritious; laxative.* When quite fresh, it is said not to be laxative, but is eaten as an article of diet. When older, it becomes more purgative and less digestible. It is a very mild laxative, and produces flatulence and griping, but does not excite vascular action in the mucous membranes, and may, therefore, be given in inflammation of the bowels.

Uses. — Delicate females and young children. Dr. Burns gives it to new-born infants, if the meconium is not readily expelled. It cannot be employed for men, as the large dose which is required causes too much nausea, griping, and flatulence. Children will readily eat it.

Dose. — ʒj to ʒiij. For an adult, ℥j to ℥ij.

TAMARIND, Tamarindus Indica (Monodelphia Triandria; Leguminosæ, sub ord. Cæsalpineæ).

Description. — This is the pulp contained between the seed-vessel and the seeds of the Tamarind tree.

Composition. — *Citric*, *tartaric*, and *malic* acids; *bitartrate of potash* and *sugar*.

Properties. — *Refrigerant; laxative*; and allays thirst. These properties are dependent upon the above-mentioned acid constituents.

Uses. — In febrile affections it is a very pleasant laxative. It may be taken in the form of whey, made by boiling ℥j of the pulp in Oj of milk and straining the product.

Dose. — ʒij to ℥ij.

CONFECTIO CATECHU COMPOSITUM, *D.*

ELECTUARIUM CATECHU, *E.*

COMPOUND CONFECTION OR ELECTUARY OF CATECHU.

D. Take of Compound powder of catechu, five ounces.
Simple syrup, five fluid ounces.
Mix.

E. Take of Catechu and kino, of each, four ounces.
Cinnamon and nutmeg, of each, one ounce.
Opium, diffused in a little sherry, one drachm and a half.
Syrup of red roses, reduced to the consistence of honey, one pint and a half.
Mix.

Medicinal properties and uses. — Aromatic, stimulant, and astringent; useful in chronic diarrhœa, and even in *recent* cases in old and relaxed people.

Dose.— A tea-spoonful to a table-spoonful.

Proportion of opium.— There is none in the Dublin confection. In the Edinburgh electuary there is nearly one grain in three drachms. About a grain and a half in a table-spoonful.

CONFECTIO OPII, *L.E.*

CONFECTION OF OPIUM.

Synonyme. Electuarium Opii, *E.*

Take of Opium, powdered, six drachms.
Long pepper, an ounce.
Ginger, powdered, two ounces.
Caraway, three ounces.
Tragacanth, powdered, two drachms.
Syrup, sixteen fluid ounces.

Rub the dry ingredients together to a very fine powder, and keep them in a covered vessel; and, whenever the confection is to be used, add the powder by degrees to the syrup made hot, and mix.

Thirty grains of the confection, or nine grains of the dry mixed powders, contain one grain of hard opium.

E. Take of Aromatic powder, ℥vi; Senega, in fine powder, ℥iij; Opium, diffused in a little sherry, ℥ss; Syrup of ginger, ℔j. Mix. Forty-three grains contain one grain of opium.

Medicinal properties and uses.—*Narcotic* and *aromatic.* It is chiefly used as an adjunct to chalk mixture in diarrhœa. It is also given in flatulent colic. The London confection is about half as strong again as that of Ed.

Dose.—According to the amount of opium wished for. Gr. xxx *L.*, or gr. xliii *E.*, contain gr. i of opium.

CONFECTIO PIPERIS (NIGRI, *D.*), *L.D.E.*

CONFECTION OF BLACK PEPPER.

Synonyme. Electuarium Piperis, *E.* Conf. Piperis Nigri, *Ph. L.* 1836. Ward's paste.

Take of Black pepper,
Elecampane (root), each, a pound.
Fennel (seeds), three pounds.
Honey (despumated),
Sugar, each, two pounds.

Rub the dry ingredients together to a very fine powder, and keep them in a covered vessel; and whenever the confection is to be used, add the powder by degrees to the honey, and pound them until incorporated.

D. Take of Black pepper and liquorice-root in powder, of each ℥ss; White sugar, ℥j; Oil of fennel, fʒss; Honey (by weight), ℥ij.

E. Black pepper, liquorice, āā ℔j; Fennel, ℔iij; Honey, White sugar, āā ℔ij.

Remarks upon the Confection of Black Pepper.

This is principally used for the cure of piles, for which it has acquired some celebrity. It is most successful in leucophlegmatic people. It probably acts topically upon the hæmorrhoids, in passing over them, when mixed with the fæces; and it is of no use unless taken for two or three months (*Brodie*). It is apt to accumulate in the colon, and therefore an occasional aperient should be taken during the time of its employment. It ought not to be given when there is a tendency to inflammation of the bowels.

Dose.—ʒss to ʒj, twice or three times daily.

PEPPER (Diandria Trigynia; Piperaceæ).

Black. Description. — This is small, round, black, and deeply wrinkled externally; but is bright-red, when ripe, before being dried. The fruit is at first green; and as soon as any of it becomes red, the whole is gathered. If it were allowed to remain upon the tree after this, the peppercorns would all drop off upon the ground as they ripened.

Black Pepper.

Cubeb or Tailed Pepper.

Long Pepper.

White.— This is black pepper deprived of its external husk. When black pepper is soaked in hot water, the husk bursts and separates, leaving nothing but the seed (white pepper).

Long.— This is seen in cylindrical pieces, from one to two inches long, and the thickness of a quill. It appears as if it were a single fruit; but if examined it will be found to consist of a large number of flowers or fruits closely clustered together upon a central stalk (catkin or spadix). Its colour is grey.

Cubeb, or Tailed Pepper, is brown, and always has a stalk attached, by which it is distinguished from black pepper.

Composition.— All the peppers agree in containing *piperin* (a crystalline substance), *acrid resin*, and *volatile oil.*

Seeds for which the peppers may be mistaken.—For each other, and for *stavesacre* seeds, which latter are, however, *angular;* and instead of having any approach of roundness, show distinctly that they have flattened sides. Their colour, also, is a paler brown than that of the peppers. It must be great carelessness which could mistake them for *pimenta* berries, which are round, but not wrinkled like peppercorns, amd have a small circular disk on their summit. *Juniper* berries, beside the difference of colour, are soft and pulpy.

Properties. — For cubebs, see OLEA DESTILLATA,—OLEUM CUBEBÆ.

All the peppers agree in being *acrid*, *stimulant*, and *aromatic.* They increase the circulation, produce heat of the stomach, assist digestion, cause diaphoresis, excite violent sneezing, exert a peculiar influence over the urino-genital mucous membranes. If given in large doses they cause inflammation of the stomach.

Peculiar Properties.

Black and *white* pepper are the least acrid. They sometimes occasion an attack of nettle-rash. *Long* pepper is generally considered the most aromatic and acrid.

Uses. — As a condiment. Black pepper has been long used in *ague*, to cut short the cold stage; and peppercorns have been chewed for the cure of *relaxed uvula* and *paralysis of the tongue or* throat. They are seldom employed alone in medicine, but are added as stimulating ingredients to several officinal preparations.

Piperin has been employed with success in some cases of *intermittent fever* which have resisted the action of quinine and other febrifuges, and it has been proposed that it should be more frequently used than at present in this disease on account of its cheapness compared with quinine. It has not, however, come into use in such cases in this country. See p. 173.

Dose.—Of black pepper, as a condiment, ad libitum; of *Piperin*, gr. vi to gr. viii in the form of pills, repeated every few hours until ℈ii or ℈iii have been taken.

ELECAMPANE, INULA HELENIUM (Syngenesia Polygamia superflua; Compositæ).

Description.—The root is sold in longitudinal or transverse sections of a yellowish-grey colour.

Composition.—*Helenium* (crystalline); *volatile oil*; *resin*; *bitter extractive*; and a large proportion of *inulin*. This is a peculiar amylaceous principle, which differs from common starch in being partly precipitated on cooling from its solution in boiling water; and, in the cold solution being rendered yellow and not blue, by the addition of iodine.

Medicinal properties. — *Aromatic*; *tonic*; and *stimulant*. In large doses, *emetic*. It possesses the power of checking excessive secretion from the bronchial mucous membrane, unaccompanied by much fever. Its properties resemble those of the sweet flag (*Acorus*), and of Senega root.

Uses. — Considering its properties, it is surprising that it is so little employed. There is no officinal preparation, but it enters into the Confection of Black Pepper. It might be administered in cases similar to those in which senega is now used.

Dose. — Of the powder, ℈j to ʒj.

CONFECTIO ROSÆ CANINÆ, *L.E.*

CONFECTION OF DOG ROSE (HIPS).

Synonyme. Conserva Rosæ Fructus, *E.* Conserva Cynosbati.

Take of Dog rose, hips without the seeds, a pound.
Sugar, powdered, twenty ounces (three pounds, *E.*).

Rub the hips with the sugar, added by degrees, until incorporated.

Remarks. — In preparing this confection, the seeds and their surrounding hairs should be carefully separated from the fruit, as they sometimes cause irritation in the stomach and bowels. This confection is liable to become candied, if long kept. It has an agreeable acidulous flavour, and has such an attraction for moisture, that pills compounded with it remain soft for a considerable period. It is supposed to be slightly *laxative*.

Uses. — It is used for giving form to pills; and owing to its slight acidity, it is frequently employed as the basis for pectoral *linctuses* (*lingo*, I lick up), for which the following is an admirable formula (*Mr. Stocker, Guy's Hosp.*): —

℞ Confect. rosæ caninæ, ℥j; Mucil. acaciæ, ʒij; Syrup. papaveris, ℥j; Succi limonum, ʒss.

M. et adde Tr. Opii vel Tr. Camph. co. &c. p. r. n.

CONFECTIO ROSÆ, *L.E.D.*

CONFECTION OF RED ROSE.

Synonyme. Conf. Rosæ Gallicæ, *Ph. L.* 1836. Conserva Rosæ, *E.*

Take of Red rose, fresh (petals), a pound.
Sugar, three pounds.

Pound the rose petals in a stone mortar; then, the sugar being added, pound them again until incorporated.

E. Beat the petals of Rosa Gallica to a pulp, gradually adding twice their weight of white sugar.

D. Fresh petals of Gallic Rose, ℥iii; White sugar, ℥viii.

Or, take of dried Petals, ℥j; Rose-water, f℥ij; White sugar, ℥viii. Macerate the petals in the rose-water for two hours, add the sugar gradually, and beat them into a uniform mass.

Medicinal use. — This confection is employed for the same purposes as the last, but is not liable to become candied or mouldy. It is slightly *astringent*.

CONFECTIO RUTÆ, *L.*

CONFECTION OF RUE.

Take of Rue, freshly bruised,
Caraway,
Bay berries, each, an ounce and a half.
Sagapenum, prepared, half an ounce.
Black pepper, two drachms.
Honey (despumated), sixteen ounces.
Distilled water, as much as is sufficient.

Rub the dry ingredients together to very fine powder, then, the sagapenum being melted in the water and honey over a slow fire, add the powder by degrees, and mix them all.

The confection is only used as an enema in flatulent colic, or as an antispasmodic in the convulsive affections of children. Dose, ℈j, in any proper quantity of gruel.

RUTA GRAVEOLENS, Rue (Decandria Monogynia; Rutaceæ).

Description. — This is an herb about three feet high, with pale green, doubly-pinnate leaves, and small yellow flowers. The whole plant has a disagreeable odour, especially when rubbed.

Composition. — *Volatile oil* (the active principle), and *bitter extractive.*

Medicinal properties. — Though this herb is little used professionally, its properties are powerful and active, and it is extensively employed as a domestic remedy. It is an *acrid narcotic; stimulant; antispasmodic*; *emmenagogue* and *anthelmintic.* The juice, applied to the skin, causes inflammation and vesication. It has been sometimes taken to produce abortion, and three cases of poisoning in this way have been recorded by Helie[*], in each of which abortion was produced after two or three days. The quantity taken was not known, except in the first case, in which the woman took three fresh roots as big as the finger. The symptoms were those produced by acrid narcotic poisons. Severe abdominal pain, vomiting, and griping; uncontrollable motion of the head and limbs, with mutterings and symptoms of intoxication. The pupils were constantly *contracted*, and there was long-continued insensibility or unconsciousness. The tongue was enormously swollen, and there was copious salivation. The pulse was remarkably feeble, and sunk to 30 beats in the minute. In one of the cases this symptom continued longer than any other. The patients recovered after many days (twelve to thirty-seven).

Uses. — Rue is chiefly employed, professionally, as an enema to relieve the *flatulent colic of infants*, for which purpose it is very valuable. It *expels ascarides* and *lumbrici*, and is extensively used for this purpose by the Irish and Scotch poor.[*] It is a powerful *antispasmodic* in *hysteria*, and *convulsions* dependent upon flatulent or disordered bowels. The *oil* is a more powerful *emmenagogue* than many of the more highly valued medicines of this class. It is a favourite domestic remedy in *amenorrhœa.*

Dose and administration. — An infusion of the fresh leaves (℥j to Oj of boiling water), dose f℥j. The oil is officinal; its dose is ♏j to ♏vi, on sugar. A syrup is commonly kept (not officinal), consisting of ♏viii or ♏x in Oj of simple syrup; dose for children, f℥j or f℥ij.

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[*] Med. Gaz. vol. xxiv. p. 171.

[†] Dr. J. B. Thompson, Lancet, 1842-43, vol. i. p. 617.

BAY BERRIES AND LEAVES, LAURI BACCÆ ET FOLIA.

LAURUS NOBILIS (Enneandria Monogynia; Lauraceæ).

Description. — Bay berries are about the size of a small hazelnut kernel, and are covered with a thin brittle, black envelope. When this is broken, the seed is seen of a dark brown colour, lying loosely within it.

Composition. — *Concrete* (obtained by expressing the berries) and *volatile oils.*

Properties. — Very unimportant. *Aromatic.* In large doses the leaves are *emetic.* The berries form part of the Confectio Rutæ; but there is no officinal preparation of the leaves. They agree in their properties. The leaves are employed by cooks to flavour blancmange, &c. It is very important that the leaves of the Cherry-laurel, Prunus Lauro-cerasus, should not be mistaken for bay leaves, as they are highly poisonous, whilst the latter are innocuous. Cherry-laurel leaves yield hydrocyanic acid by distillation, which bay leaves do not.

Dose. — They are never prescribed alone.

Oleum (express) Lauri (not officinal), Oil of Bays. This oil is obtained by bruising the berries, and boiling them in water. They are afterwards pressed in a cloth, and the oil and water which escape separate on cooling, the oil rising to the surface.

Characters. — Oil of Bays is a solid oil, granular in its appearance, and about as hard as butter, and is of a greenish colour.

Properties and uses. — It is stimulant, and enters into some stimulant liniments (not officinal). It is used by the poor in some places for killing lice.

CONFECTIO SCAMMONII, *L.D.*

CONFECTION OF SCAMMONY.

Synonyme. Electuarium Scammonii, *D.*

Take of Scammony, an ounce and a half.
Cloves, bruised,
Ginger, powdered, each, six drachms.
Oil of caraway, half a fluid drachm.
Syrup of roses, as much as may be sufficient.

Rub the dry ingredients together to very fine powder, and preserve them in a closed vessel; then, whenever the confection is to be used, the syrup being gradually poured in, rub again; lastly, the oil being added, mix them all.

D. Scammony, ℥iij; Ginger, ʒjss; Oil of caraway, fʒj; Oil of cloves, fʒss; Simple syrup, f℥iij; Clarified honey (by weight), ℥jss.

Medicinal use.—This is a stimulating cathartic, and may be given in the dose of ℈j to ʒj. It is but seldom used.

For children, the dose may be from gr. x to gr. xx. The oil of caraway is added to prevent griping.

CONFECTIO SENNÆ, *L.D.E.*

Confection of Senna.

Synonyme. Electuarium Sennæ, *E.* Electuarium Lenitivum, *Ph. L.* 1746.

Take of Senna, eight ounces.
Figs, a pound.
Tamarind, prepared,
Cassia, prepared,
Prunes, prepared, each, half a pound.
Coriander, four ounces.
Liquorice, fresh and bruised, three ounces,
Sugar, two pounds and a half.
Distilled water, three pints.

Rub the senna with the coriander, and by a sieve separate ten ounces of the mixed powder. Then boil down the water, with the figs and liquorice added, to one half; afterwards press out (the liquor) and strain it. Evaporate the strained liquor in a water-bath, until of the whole, twenty-four fluid ounces remain; then, the sugar being added, let a syrup be made. Mix the tamarinds, cassia, and prunes with this; and, shortly before they are cold, the sifted powder being added by degrees, stir it diligently with a spatula until it is a uniform mass.

E. Senna, ℥viij; Coriander, ℥iv; Liquorice root, bruised, ℥iii; Figs, ℔j; Pulp of prunes, ℔j; White sugar, ℔iiss; Water Oiii and ℥v.

D. Senna, ℥ij; Coriander, ʒj; Oil of caraway, fʒss; Pulp of prunes, ℥v; Pulp of tamarinds, ℥ij; Brown sugar, ℥viii; Water, f℥ij.

Remarks.—The purgative property of the senna &c. is aided by the figs, tamarinds, cassia, and prunes, and when well prepared this is an agreeable and efficient purgative, which is much employed for pregnant women and children. It is, however, very liable to gripe. It is frequently adulterated with jalap, and the senna is often entirely omitted.

Dose.—ʒj to ℥ss or ʒvi.

PRUNES, PRUNUS DOMESTICA (Icosandria Monogynia; Amygdaleæ).

Prunes are slightly laxative, and have an agreeable acid-sweetness. They are frequently added to cathartic mixtures, and are sometimes stewed and eaten as a laxative article of diet.

CONFECTIO SULPHURIS, *D.*

CONFECTION OF SULPHUR.

Take of Sublimed sulphur, two ounces.
Bitartrate of potash, one ounce.
Clarified honey, by weight, one ounce.
Syrup of ginger.
Syrup of saffron, of each, half a fluid ounce.
Mix.

Medicinal properties and uses.—An officinal form of "brimstone and treacle," which is a valuable laxative and "purifier of the blood." It is chiefly given to children, when affected with almost any form of cutaneous eruption, or requiring an aperient medicine.

CONFECTIO TEREBINTHINÆ, *D.*

CONFECTION OF TURPENTINE.

Take of Oil of turpentine, one fluid ounce.
Liquorice root, in powder, one ounce.
Clarified honey, by weight, two ounces.

Rub the oil of turpentine with the liquorice powder, then add the honey, and beat them all together.

Remarks.—It is difficult to conceive on what principle this confection has been made, the oil of turpentine being nasty enough of itself, without the torture of having to suck it down like jam.

Dose and uses.— Two table-spoonfuls. It is chiefly given to expel tape-worms.

DECOCTA.

DECOCTIONS.

Remarks.—Decoctions do not differ essentially from infusions; but owing to the longer application of the heat, some principles, such as starch and tannin, which are not quickly dissolved, are contained in them in greater abundance; owing to this circumstance they are also more liable to decomposition, if long kept: and hence they should only be prepared at the time they are wanted. Any volatile or aromatic ingredient is generally driven off or impaired in its flavour by the continued heat, and decoctions are therefore less agreeable than infusions. In some cases, a precipitate falls down as the decoction cools, owing to the matter dissolved by the heat, being insoluble in cold water: hence all decoctions should be strained whilst hot.

DECOCTUM ALOËS COMPOSITUM, *L.D.E.*

COMPOUND DECOCTION OF ALOES.

Synonyme. Decoctum Aloës, *E.*

Take of Extract of liquorice, seven drachms.
Carbonate of potash, a drachm.
Extract of Socotrine aloes,
Myrrh, powdered,
Saffron, each, a drachm and a half.
Compound tincture of cardamom, seven fluid ounces.
Distilled water, a pint and a half.

Boil down the liquorice, carbonate, aloes, myrrh, and saffron with the water, to a pint, and strain; then add the tincture.

Ed. Socotrine or hepatic aloes, myrrh, saffron, āā ʒj; Ext. of liquorice, ℥ss; Carb. of potash, ℈ii; Comp. tinct. of cardamom, f℥iv; Water, f℥xvi. Boil down to f℥xii.

Dub. Hepatic aloes, ʒiss; Myrrh, saffron, āā ʒj; Carb. potash, ℈ii; Ext. of liquorice, ℥ss; Comp. tinct. cardamoms, as much as is sufficient; Water, f℥xiv. Boil for ten minutes, cool, strain through flannel, and add as much Comp. tinct. of cardam. as will make up f℥xvi.

Remarks upon the Decoction.—The carbonate of potash is here added in order to procure the ready solution of the resin of the aloes, and the liquorice is to cover the bitter taste. The myrrh and saffron are intended to promote its action upon the pelvic viscera. It is not very constant in its operation, and not unfrequently fails to act, when taken in the usual dose. It is, however, a valuable mild cathartic, tonic, antacid, and emmenagogue. Acids and acidulous salts are incompatible with it; but, if desirable to combine chalybeates, the Ferri Potas.-tart., or the Ferri Am.-tart., may be added.

Dose.—From f℥ss to f℥ij.

ALOE (Hexandria Monogynia; Liliaceæ).

Description and varieties.—The general characters of the Aloe plant are well known, viz. its thick fleshy leaves, generally covered with spines. Beneath the epidermis of the leaf are peculiar longitudinal cells, which contain a brownish juice. This juice, when extracted by breaking or bruising the leaf, and evaporated to a proper consistence, constitutes aloes. Several species yield the aloes employed in medicine. There are three or four principal varieties of this drug, viz. Socotrine, and Hepatic, Barbadoes, Cape, and East Indian, Aloes.

Socotrine.—This is often considered the most valuable kind. It occurs in pieces one or two inches thick, which are generally smooth, translucent, and have a *glassy* fracture. If a small piece is broken off with the nail, it is of a garnet-red colour, especially by transmitted light. The odour of this species is considered to be finer than that of the others.

Socotrine aloes.	Brittle; bitter; of a reddish-brown colour; and aromatic odour: light permeates fresh thin layers of it.

Hepatic.—Derives its name from its brown colour, resembling that of the liver. It comes over in the same cases or skins with the Socotrine.

Hepatic.	Opaque; of a liver colour; bitter taste; and unpleasant odour.

Barbadoes.—This kind is imported in gourds or calabashes, portions of which frequently adhere to the aloes. The colour is deep brown, almost black, and its fracture is *conchoidal.* Its odour when breathed upon is disagreeable. It is not so smooth or translucent as Socotrine. Until lately it was not considered so good as the former kinds; but it is now preferred by many as being more active.

Barbadoes. { Opaque; dull; of a liver colour, sometimes blackish; of a bitter nauseous taste, and very disagreeable odour.

Cape is generally very impure. Its colour is deep brown; and it strongly resembles the last in its characters; but its fracture is more *resinous*, and its thin edges are translucent, and of a yellowish-red colour.

Indian. — By this name the Ed. Coll. probably indicates hepatic aloes, which is brought from Bombay, though it is not produced there. The true Indian aloes, which is still coarser than the Cape, is certainly not intended by the Ed. Ph. (*Royle*).

Substances for which aloes may be mistaken. — *Fine scammony.* Aloes is distinguished by its close shining appearance; *its odour*, when breathed upon; and by becoming sticky when warmed in the fingers.

General medicinal properties. — *Purgative; emmenagogue?*

Characteristic properties as a purgative.—It is very slow in its operation, and somewhat irregular; not usually operating under twenty-four hours. It is very slowly dissolved in the bowels, and hence acts principally upon the large intestines; it also stimulates the pelvic viscera generally, and is therefore often combined with emmenagogues, and given to chlorotic patients. It is thought to act upon the liver, and to excite the secretion of bile; and is said to produce piles and to be injurious, if these exist before its administration. It is powdered with difficulty, adhering obstinately to the sides of the mortar and pestle; the powder also which rises from it is very irritating, causing violent and continued sneezing. If a few drops of olive oil are dropped upon an ounce of aloes before beginning to powder it, all these difficulties are obviated without interfering with its pulverisation.

Uses. — Aloes are very generally employed as a common purgative, combined with other medicines of this class to promote its operation. It is often given in cases of *habitual constipation* with a deficient secretion of bile; and to chlorotic patients, whose large intestines are generally sluggish and loaded with fæces. It should be avoided when there is a disposition to piles. Dr. Greenbow says it often assists the action of diuretics after they have failed to act when employed alone.[*]

Constipation is frequently dependent upon deficiency of nervous tone in the rectum, and a combination of aloes with sulphate of iron is frequently valuable in the constipation of chlorotic females whose whole appearance shows an absence of nervous power.

Composition. — *Aloësin* (saponaceous matter or bitter principle), *resin*, and *aloëtic acid.*

Doses. — One or two grains will generally procure one or two stools (*Cullen*); but fifteen or twenty grains are frequently given.

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[*] Med. Gaz. vol. xix. p. 269.

The usual dose is from one or two to five or ten grains; and it does not appear as if a larger quantity than this acts with any greater certainty or efficiency. Aloes are rarely or never prescribed alone, but are always given in combination with some other medicine. A valuable combination is the Pil. Cambog. co. The gamboge being very soluble acts upon the *small* intestines, and promotes the action of the slightly soluble aloes upon the *large* intestines.

DECOCTUM AMYLI, *L.*

DECOCTION OF STARCH.

Take of Starch, four drachms.
Water, a pint.

Rub the starch with the water added by degrees, and then boil for a short time.

Remarks.—STARCH is a vegetable proximate principle, which exists abundantly in flour, and in potatoes, and occurs in most vegetable substances that are used as food. It is obtained from potatoes by simply grating them into a coarse pulp, mixing with a considerable quantity of water, and straining the mixture through a coarse cloth. The starch passes through, and subsides when the liquor is left at rest. It is to be dried, as soon as the clear water is poured off. The method of separating it from wheat flour is more complicated. It exists here combined with gluten, which communicates the tenacious property that distinguishes wheat flour from that of oats or other kinds of grain. The wheat is coarsely ground, and then mixed with water that has become sour, from having had flour left in it for some days. The acetic acid which is thus formed dissolves the gluten of the newly ground flour, and renders the separation of the starch more easy. Sometimes carbonate of potash is employed instead of the sour water, as it possesses the same property of dissolving the gluten. The starch is then washed out and allowed to subside as before, and is afterwards dried.

Varieties.—Common wheat starch is generally in pieces from one to two inches long, and more or less regularly four-sided. It is not crystalline, though its usual form has a slightly crystalline appearance. This is occasioned simply by the cracking of the starch as it dries. Starch obtained from potatoes is generally in the state of a colourless powder. Starch, or amylum, variously modified by heat, and by differences in the method of preparation, is the chief chemical constituent of cocoa, tapioca, arrow-root, sago, and tous-les-mois.

Properties.—Starch is soluble in boiling water, but is insoluble in cold water. It consists of minute vesicles, composed of an external thin membrane, within which is contained the peculiar matter of the starch. The membrane itself is insoluble in cold water, but the contents are soluble. The heat causes the membrane to burst, and the water then dissolves the starch, forming a fluid solution whilst hot, which becomes a tremulous solid on cooling. That which is commonly sold has a blue colour, derived from smalt or powdered blue glass.

Test.—When iodine is added to a *cold* solution of starch, a deep blue colour is produced. It is essential that the solution should be cold; for if it is hot, the blue colour is not formed. If the liquid in which the blue colour has been produced is heated, the colour entirely disappears; but it re-appears on again cooling the solution.

Uses.—Chiefly as an emollient vehicle for other substances, in the form of enema. The decoction is also extensively used for making the "starched bandage" for the treatment of fractures, and of talipes, after the tendo Achillis has been divided. A starched bandage is generally two or three days before it becomes perfectly dry and firm.

DECOCTUM BÊLÆ. (Not Off.)

Decoction of Bêla, Bæl, or Bêl.

Take of the Dried unripe Bael fruit, two ounces.
Water, one pint.

Let the water containing the fruit simmer to a quarter, and strain whilst hot.

Remarks.—This decoction spoils so rapidly, even in cold weather, that it must be made fresh every day.

Dose.—f℥iss three or four times a day, or even in some cases as frequently as every three hours.

BAEL, BÊL, or BÊLA.

Ægle Marmelos, or Cratæva Marmelos; Aurantiaceæ.

Description.—This remedy, though but recently introduced into this country, has long been known and highly valued in Bombay, of which place the tree producing it is a native. The part chiefly used is the *unripe* dried fruit, though the bark of the root and of the stem and the fresh leaves are also employed. The fruit resembles a pomegranate orange in the deep claret red colour of the pulp; but the rind is far thicker than that of an ordinary orange, being at least three times the thickness even when dried. As it is brought to this country it is in pieces, which look as if a dried orange had been broken into five or six pieces at random.

Medicinal properties and uses.—There has been but little time as yet to test the effects of Bael in this country; but the letters which I have received from Dr. Stewart and Dr. Ferguson, a slight trial by Dr. Cameron, and my own limited experience of it, confirm the following account of its effects in diarrhœa, communicated to the Lancet by J. R. Martin, F.R.S., Surg. Bengal Army, retired; late Presidency Surg., and Surg. to the native hosp. Calcutta.

Within these few years the Bale, or Bael, fruit of Bengal, has been held to be very efficacious in the treatment of *chronic dysentery and diarrhœa.* This fruit, incorrectly termed the Bengal quince, for in reality it is of the orange tribe, is imported into England in its unripe dried state, and also in the state of sugared preserve made of the ripe fruit. "As to the Bael fruit," says a professional friend in Calcutta, "I consider it the most certain remedy we possess for chronic dysentery and diarrhœa. I have frequently seen it arrest the progress of these diseases in twenty-four hours, after all other medical treatment had failed. On what the curative property of the fruit depends I know not; it is certainly not astringent to the taste, or, at all events, very slightly so. I am inclined to believe that much of its efficacy may reside in the thick mucilage which surrounds the seeds of the fruit. A singular property of the fruit is this, that it does not merely restrain undue action of the bowels, as in diarrhœa and dysentery, but also in cases of obstinate habitual constipation acts as a mild and certain laxative. It may be said in all cases to regulate the bowels."

The *ripe* fruit of the bael (which is a *mild laxative*) is, with sugar, made into a jelly or preserve, and found valuable as an article of food for those who suffer from irritation of the stomach and habitual costiveness; and this jelly or preserve may be eaten with impunity when other articles of food produce renewed irritation, attended with a sensation of oppression after having been taken into the stomach.

The Bael jelly, when eaten at meals as marmalade, relieves habitual constipation without inconvenience, and at the same time prevents flatulence and assists digestion. The quantity usually taken is from one to two table-spoonfuls on bread or toast during a meal.

Composition.—"The pulp and the dried shell of the fruit do not appear to me to differ chemically in any respect, except as to quantity. They both contain—1, tannic acid; 2, a concrete essential oil; 3, a bitter principle, which is not precipitated by tribasic acetate of lead, and a vegetable acid. The pulp, as I received it, also contained a considerable quantity of sugar, in which it was preserved. All three of the substances I have mentioned exist in the largest quantity in the dry rind. There is most acid in the pulp." (*Mr. Henry Pollock.*)

Mr. Pound states that in the fruit, as imported by him, the mucilage exists in about the proportion of twenty per cent., which is probably the reason why the decoction so quickly spoils.

Liquor belæ.—In consequence of the readiness with which the decoction spoils, Mr. Pound, by whom the bael was introduced into England, prepares a solution under this title, which is about four times the strength of the decoction, and keeps without difficulty. An extract is also prepared.

Dose.—Of the *decoction* ℥iss several times a day. Of the *liquor* ʒij or ʒiij. Of the *extract* gr. x.

DECOCTUM CETRARIÆ, *L.D.*

Decoction of Iceland Moss.

Synonyme. Decoctum Lichenis Islandici, *D.*

Take of Iceland moss, five drachms (℥j, *D.*).
Distilled water, a pint and a half.
Boil down to a pint, and strain.

CETRARIA ISLANDICA (Cryptogamia; Lichenes).

Description.—The Cetraria is commonly, though incorrectly, called Iceland *moss*, for it is really not a *moss*, but a *lichen.* It swells up in cold water, and when boiled, yields a liquid, which, when sufficiently concentrated, becomes gelatinous on cooling.

Composition.—It contains a peculiar kind of *starch*; *lichenic acid*, which forms precipitates with metallic salts, and is hence incompatible with them; and *cetrarin*, which communicates the bitter flavour to this substance.

Medicinal properties.—It is a *bitter mucilaginous tonic*, without any astringency. If the bitter principle (cetrarin) is not first removed, it can scarcely be taken as food or medicine. It forms a light, nutritious, tonic article of diet, which is not liable to disorder the stomach.

Uses.—*Phthysis* and *chronic catarrh*, *dyspepsia*, and *diarrhœa.* It has been very highly commended in these cases; but its good effects have been somewhat overrated.

Administration.—The bitter principle should be removed before making the decoction, which may be done by macerating the lichen in a cold weak solution of carbonate of potash (1 part in 300 parts of water), and afterwards washing in cold water. What is left is then to be boiled in water or milk, and flavoured with anything that may be most agreeable to the palate.

Dose.—f℥j to f℥iv, every three or four hours.

DECOCTUM CHIMAPHILÆ, *L.*

DECOCTION OF WINTER GREEN OR PYROLA.

Take of Winter green or pyrola, an ounce.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

CHIMAPHILA UMBELLATA (Decandria Monogynia; Pyrolaceæ).

Description. — Chimaphila is generally packed in rectangular paper cases, about six inches long, three inches broad, and an inch and a half deep. The dried leaves have a dark brown colour, and appear hard and brittle: they are always mixed with the rigid leaf and flower stalks, and the empty calices of the corymbs may generally be found connected with them.

Composition. — *Bitter extractive; resin; and tannin.*

Medicinal properties. — *Tonic; diuretic.* It has a remarkable effect upon the kidneys, increasing the quantity of urine, and at the same time diminishing that of the lithic acid secreted. In many respects it resembles uva ursi and buchu in its effects, and there is also a similarity in the general character of the plants.

Uses. — Winter green has acquired a very high reputation in *scrofula*, and has been much extolled in the treatment of this disease in its various forms. In *atonic dropsies;* and in various *chronic affections of the urinary organs*, as *catarrh* of the *bladder*, and *calculous complaints*, it has frequently been serviceable.

Incompatibles. — *Salts of iron*, owing to the tannin in its composition.

Dose. — It is generally employed in the form of decoction, in doses of f℥j to f℥ij three or four times daily. Its use must be persisted in for some time in order to produce much good effect. The extract, which is not officinal, is sometimes given in doses of gr. v to gr. xv.

DECOCTUM CINCHONÆ, *L.D.E.*

DECOCTION OF YELLOW BARK.

Synonyme. Decoctum Cinchonæ Cordifoliæ, *Ph. L.* 1836.

Take of Yellow (crown or pale, *D.*; crown, grey, yellow, or red, *E.*) cinchona, bruised, ten drachms.
Distilled water, a pint (f℥xxiv., *E.*).

Boil for ten minutes in a lightly-covered vessel and strain the liquor while hot (evaporate to ℥xvi, *D.E.*).

Remarks.—The active principle is this decoction is kinate of quina.

DECOCTUM CINCHONÆ PALLIDÆ, *L.D.E.*

DECOCTION OF PALE BARK.

Synonyme. Decoctum Cinchonæ Lancifoliæ, *Ph. L.* 1836.

This is to be prepared in the same way as Decoctum Cinchonæ.

Remarks.—The active principle in this decoction is kinate of cinchonia, with a small proportion of kinate of quina. It is rather more aromatic than the other decoctions, but scarcely so powerful. Hence it is employed as a general tonic, rather than as a febrifuge in ague.

DECOCTUM CINCHONÆ RUBRÆ, *L.E.*

DECOCTION OF RED BARK.

Synonyme. Decoctum Cinchonæ Oblongifoliæ, *Ph. L.* 1836.

This is to be prepared in the same way as Decoctum Cinchonæ.

Remarks.—The active principles in this decoction are kinate of quina and cinchonia, in nearly equal proportions. These decoctions are clear when first made, but become turbid on cooling, owing to the precipitation of the tannate of starch, and of red and yellow cinchonin, all of which are insoluble in cold water. The decoctions ought, therefore, to be strained whilst hot; and the precipitate which afterwards falls, is not to be thrown away. By long continued boiling, a larger portion of the constituents of the bark is rendered insoluble; the Pharmacopœia, therefore, directs the heat to be continued only ten minutes, and the vessel to be covered.

Boiling water extracts from the bark kinates of quina, cinchonia, and lime; gum; soluble red cinchonin (tannin); and starch; colouring matter; and a compound of red cinchonin and the alkaloids, which is insoluble in cold water, and is, therefore, precipitated on cooling. If an acid (sulphuric or hydrochloric) is added to the water, previous to making the decoction, it decomposes the insoluble compound of red cinchonin and the alkaloids, and combines with the latter, forming a soluble salt; and is, therefore, a useful addition. On the other hand, if alkalies are added to the water, they do indeed cause the decoction to have a deeper colour, but they combine with the cinchonin and form an inert compound, whilst the alkaloids which are separated are undissolved by the boiling water, and they therefore materially injure the preparation. It is, however, to be remembered, that the compound of red cinchonin and the alkaloids, though insoluble in cold water, is probably entirely dissolved by the acid secretions of the stomach, and produces its proper effects.

Medicinal properties and uses. — See ALKALIES, — DISULPHATE OF QUININE, p. 183.

Dose and administration. — f℥j to f℥iij, three or four times daily. It is usual to add some dilute sulphuric acid to the decoction; and this may be used as the vehicle for the exhibition of disulphate of quinine.

DECOCTUM CYDONII, *L.*

DECOCTION OF QUINCE (SEEDS).

Take of Quince (seeds), two drachms.
Distilled water, a pint.

Boil with a slow fire for ten minutes; afterwards strain.

QUINCE, CYDONIA VULGARIS (Icosandria Pentagynia; Pomaceæ).

Description — Quince seeds are like magnified apple pips; they are oval at one extremity, and acute at the other; flat on one side, and convex on the other. Their colour is reddish-brown.

Seeds for which they may be mistaken. — *Stavesacre and linseed.* The above characters are quite sufficient for distinguishing them.

Composition. — The seeds are the only part of the quince which are employed in medicine, but the fleshy fruit is used as a flavouring ingredient in apple tarts. The seeds contain a peculiar mucilaginous principle, termed *cydonin* by Dr. Pereira. It is usually considered to be *bassorin* (see PULV. TRAG. CO.), but is distinguished from it by being soluble both in hot and cold water. It also contains an azotized ingredient, which causes the decoction to decompose rapidly, and the seeds are said to yield hydrocyanic acid when distilled.

Medicinal properties and uses. — *Mucilaginous demulcent.* The decoction is never used internally, but is employed, as a soothing application, to sore nipples, chapped lips, aphthous mouth, erysipelatous surfaces, and to painful hæmorrhoids.

Incompatibles. — *Most metallic solutions and acids.* Alcohol causes a precipitate very slowly, but may be added to the decoction if thought desirable.

DECOCTUM DULCAMARÆ, *L. D. E.*

Decoction of Woody Nightshade, or Bitter-sweet.

Take of Woody Nightshade, ten drachms.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

Ed. Dulcamaræ, ℥i; Water, f℥xxiv. Boil down to f℥xvi.— *Dub.* Dulcamaræ, ℥ss; Water, f℥x. Boil to f℥viii.

SOLANUM DULCAMARA (Pentandria Monogynia; Solanaceæ).

Description.—The stalks of dulcamara are kept in short pieces, one or two inches long. They are pale green externally, hollow internally, and about the thickness of a goose quill. There are not any adhering leaves. The stalks should be gathered in autumn.

Composition. — All the active ingredients are extracted by boiling water. They are, a peculiar alkaloid, *solanin*, combined with *malic acid;* and another principle, *picroglycein* (*picros*, bitter; *glucus*, sweet), the taste of which is bitter at first, but is ultimately sweet, from which property the plant takes its name.

Medicinal properties. — *Alterative.* It is stated to be diaphoretic and diuretic, but it may be given in considerable doses for a length of time, without producing any effects which can be thus denominated. It is said to have produced narcotic effects, when given in excessive doses; and Dr. A. T. Thomson * describes the symptoms produced by too large a dose at the commencement, as being nausea; syncope; palpitation; and convulsive twitchings of the eyes, lips, and hands. I have, however, frequently taken it in three or four times the dose which he prescribes, without perceiving any effects from it. Dr. Billing speaks of its alterative powers in high terms, and thinks it is not sufficiently used.†

Uses. — It is employed in *chronic rheumatism;* in *scaly diseases* of the *skin;* and in various cachetic conditions of the system, in which sarsaparilla is thought to be useful. It is said by Bateman to be very useful in the treatment of *lepra vulgaris*, and its administration has also been followed with benefit in *scabies*, *pityriasis*, *psoriasis*, and *eczema*. It is sometimes used in *humoral asthma*. Thomson asserts that it is not of the smallest value in chronic rheumatism.

Dose and administration.—The decoction is the best form for its employment. It should be combined with some bitter, to cover its sickly mawkish taste.

The dose is generally stated at f℥ss to f℥j. It may be safely given in doses of f℥ij to f℥iv, three or four times daily.

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* London Dispensatory.

† First Principles of the Pract. of Med.

DECOCTUM GALLÆ, *L.*

DECOCTION OF GALLS.

Take of Galls powdered, two ounces and a half.
Distilled water, two pints.
Boil down to a pint, and strain.

Medicinal properties and uses.—This is a powerful astringent, and may be used internally in chronic diarrhœa, or applied locally in cases of prolapsus of the rectum, in children; or used as an injection in leucorrhœa.

Dose.—f℥j, several times a day.

DECOCTUM GRANATI, *L.*

DECOCTION OF POMEGRANATE.

Take of Pomegranate (rind), two ounces.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

PUNICA GRANATUM (Icosandria Monogynia; Myrtaceæ).

Description.—The *rind* of pomegranate *fruit* occurs in hard dry pieces resembling dried orange peel, except that it is above twice the thickness; it has a dull and dark, not a bright orange, colour; and retains its form, as when first separated from the fruit, instead of being shrivelled up in drying.

Composition.—Both the fruit and the *rind* contain a large quantity of *tannin*, and a small quantity of *gallic acid*, on which their astringency depends. The bark contains also a peculiar *resin*, and a sweet substance termed *mannite* or *granadin*.

Medicinal properties and uses.—The fruit rind is *astringent*. The decoction is used in most cases requiring astringents, as relaxed sore throat, diarrhœa, colliquative sweats, leucorrhœa, &c. As an injection, in the last disease, it is preferable to decoction of oak bark, as it does not give so deep a stain to the linen, if it comes in contact with it.

Dose.—f℥j, several times a day. If used as an injection, f℥ij, night and morning.

DECOCTUM GRANATI RADICIS, *L.*

DECOCTION OF POMEGRANATE ROOT.

Take of Pomegranate root, sliced, two ounces.
Distilled water, two pints.
Boil down to a pint, and strain.

Medicinal properties and uses.—Pomegranate root is exclusively used as an *anthelmintic.* It is said to be more efficacious even than turpentine in expelling tape-worms, and that it does not cause such sickness as turpentine. In an over-dose, it causes sickness, vomiting, purging, and giddiness.

Dose.—f℥ij to f℥iij every half hour, until a pint has been taken. It is not unusual for the first or second dose to produce vomiting, which should not, however, prevent the repetition of the medicine. The patient should live low the previous day, and a dose of castor oil should follow its employment.

DECOCTUM GUIACI, *E.*

Decoction of Guiacum.

Take of Guiac turnings, ℥iii; Raisins, ℥ii.
Sassafras, rasped, and liquorice root, bruised, each, ℥i.
Water, Oviii.

Boil the guiac and raisins with the water gently down to five pints, adding the liquorice and sassafras towards the end. Strain the decoction.

Remarks.—The efficiency of sassafras depends upon a volatile oil, which is dissipated by heat. It is therefore important not to add it until near the end of the boiling.

Medicinal properties and uses.—This decoction is a *stimulating diaphoretic,* and corresponds closely with the Mistura Guiaci of the Ph. Lond. It is used in the same cases and in the same way. (See Mist. Guiac.)

Dose.—f℥j every two hours, until sweating or purging is produced.

DECOCTUM HÆMATOXYLI, *L.D.E.*

Decoction of Logwood.

Take of Logwood cuttings, ten drachms.
Distilled water, a pint and a half.
Boil to a pint, and strain.

Ed. Logwood, ℥i; Cinnamon, ʒj; Water, Oj. Boil the logwood to f℥x, adding the cinnamon towards the end.

D. Logwood, ℥j; Water, f℥x. Boil to f℥viii.

Remarks.—Both the Dub. and Ed. decoctions are about twice the strength of the London one. This is not of so much consequence as it would be in some remedies, because astringents are ordered to be repeated until the desired effect is produced, and therefore it will only be that a few doses more or less must be taken.

Medicinal properties and uses.—*Astringent.* It is very useful in chronic dysentery, and is most beneficially taken by mixing the decoction with an equal quantity of milk, and taking it as an article of diet. (See Ext. Hæmatox.)

Dose.—f℥j to f℥ij, repeated several times daily, until the desired effect is produced.

DECOCTUM HORDEI, *L.D.*

Decoction of Barley.

Synonyme. Barley water.

Take of Barley (pearl or Scotch barley), two ounces and a half (℥ivss, *D.*).
Distilled water, four pints and a half.

First wash the barley with water lest any foreign matter should adhere to it; afterwards, half a pint of the water being poured upon it, boil a little while. This water being thrown away, pour on what is left, first made hot; then boil down to two pints, and strain.

Description and varieties.—When barley has been deprived of its husk, it is called *Scotch* barley. If the grains have been afterwards rounded by being rubbed together in a mill, it is termed *pearl barley.*

Seeds for which it may be mistaken.—*Sabadilla.* (See Alkalies,—Veratria, p. 202.)

Composition.—Barley consists, principally, according to Proust, of *gum*, *sugar*, *starch*, and *hordein.* The last ingredient is not soluble in water, but during the process of germination, it is converted into sugar and starch. At the same time, a new principle called *diastase* is developed, which possesses the remarkable property of converting starch into sugar; a change that is necessary before alcohol can be formed from malt or potatoes, which contain much starch, and but little sugar.

Medicinal properties.—*Emollient and demulcent.*

Uses.—It is invaluable as a drink in acute *gonorrhœa*, and in the *strangury* produced by blistering plasters; in which cases it should be copiously taken. In *febrile* and *inflammatory* cases, it is a mild, pleasant beverage, when flavoured with sugar and lemon peel or lemon juice. It is a very good article of diet for infants, when suffering from the feverishness and restlessness of teething, at times when there may be no distinct indications for treatment.

Dose.—Ad libitum.

Preparations.—Decoctum Hordei compositum. Enema Aloës. Enema Terebinthinæ.

DECOCTUM HORDEI COMPOSITUM, *L.*

Compound Decoction of Barley.

Synonyme. Decoctum Pectorale.

Take of Decoction of Barley, two pints.
Figs, sliced, two ounces and a half.
Liquorice (root), fresh and bruised, five drachms.
Raisins (stoned), two ounces and a half.
Distilled water, a pint.
Boil down to two pints, and strain.

Remarks. — It is absurd to order distilled water in this preparation and the last, which are always made by the cook, who never has it.

Medicinal properties. — The figs and raisins render the compound decoction slightly *aperient*, in addition to the other properties of the simple decoction, and also improve its flavour.

Uses. — Similar to those of the simple decoction, p. 269.

Dose. — Ad libitum.

FIGS, Ficus Carica (Polygamia Diœcia; Urticaceæ).

Properties. — Slightly *laxative* and *demulcent:* they occasion griping if used in large quantities. They contain a peculiar kind of sugar, which is the chief constituent, and they are employed in the compound barley water, on account of their demulcent property, and their flavour.

Roasted and then split open, they are sometimes used as a poultice to promote the suppuration of gum boils.

RAISINS, UVÆ, Vitis Vinifera (Pentandria Monogynia; Vitaceæ).

Properties. — Similar to those of figs, but not quite so laxative, nor so liable to cause griping. They are introduced into the same preparations and with the same intentions as figs; which they also resemble in general composition.

DECOCTUM MALVÆ COMPOSITUM. (Not Off.)

Compound Decoction of Mallow.

There is not now any officinal preparation of mallow, though it is still retained in the Materia Medica of the Ed. Ph. I have there-

fore inserted the following from the last edition of the London Ph. 1836.

Take of Mallow, dried, an ounce.
Chamomile, dried, half an ounce.
Water, a pint.

Boil for a quarter of an hour, and strain.

Medicinal properties.* — *Emollient* and *demulcent.

***Medicinal uses.*— Employed in fomentations; and administered as an enema in tenesmus. It is seldom prescribed internally; but it is sometimes used in irritation of the alimentary canal, or of the pulmonary or uninary organs.**

DECOCTUM LICHENIS ISLANDICI, *D*

Decoction of Iceland Moss, see Decoctum Cetrariæ, p. 262.

DECOCTUM LINI COMPOSITUM, *D.*

Take of Linseed, ℥i; Liquorice root, bruised, ℥ss; Water, Oiss. Boil for ten minutes, and strain whilst hot.

DECOCTUM MEZEREI, *E.*

Decoction of Mezereon.

Take of Mezereon, in chips, two drachms.
Liquorice root, bruised, half an ounce.
Water, two pints.

Boil, with a gentle heat, to a pint and a half, and then strain.

Medicinal properties and uses. — *Acrid stimulating diaphoretic.* It is scarcely ever used alone. (See Decoct. Sarz. co.)

Dose. — f℥j to f℥ij.

DECOCTUM MYRRHÆ, *D.*

Decoction of Myrrh.

Take of Myrrh, two drachms.
Water, eight fluid ounces and a half.

Triturate the myrrh with the water, gradually added; then boil for ten minutes in a covered vessel, and strain. The product should measure about eight ounces.

DECOCTUM PAPAVERIS, *L. D. E.*

Decoction of Poppy.

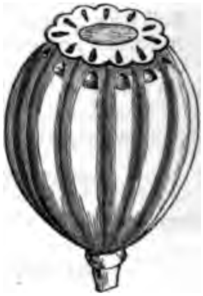
Take of Poppy (capsules), bruised, four ounces.
Water, four pints (three pints, *D. E.*).

Boil for a quarter of an hour, and strain.

PAPAVER SOMNIFERUM (Polyandria Monogynia; Papaveraceæ).

Description. — Poppy capsules are yellowish-white and oval, with a flat crenated disk (stigma) on the summit. They consist of many cells internally, which are filled with small oily seeds. Near the top of the capsule, beneath the disk, are several small openings (valves) by which the seeds escape. If the capsule has been gathered before being fully ripe, the valves are closed, and cannot be observed without some degree of care.

The capsules vary from the size of a small egg to that of the fist. They are *distinguished from colocynth pepos* by their disk and striated exterior.



Composition.— *Poppy capsules* contain a very small quantity of *morphia*, or rather, perhaps, of the *dried juice*, from which *opium* is obtained. The *seeds* contain a considerable quantity of *oil*. The quantity of opium juice is much less in the ripe than in the unripe fruit, which should therefore always be gathered before maturity, as its medicinal properties are then the strongest. The Ph. Ed. orders the unripe (heads) capsules to be used.

Medicinal properties of the decoction. — *Anodyne* and *emollient.*— It is doubted by some writers, whether it is more useful than any simple mucilaginous decoction. Some persons advise that the seeds should be removed before making the decoction; but this is certainly wrong, as the emollient effects of the oil would thereby be lost.

Uses.— As an anodyne fomentation to painful, inflamed, bruised or excoriated parts; to the eye, in ophthalmia; to the abdomen, in peritonitis, &c. It is sometimes thrown up the vagina as an injection in cancer and other painful affections of the womb.

DECOCTUM PAREIRÆ, *L.*

DECOCTION OF PAREIRA.

Take of Pareira, sliced, ten drachms.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

CISSAMPELOS PAREIRA (Diœcia Monadelphia; Menispermiaceæ).

Description. — Pareira root is met with in pieces from three or four inches to four feet long, and one or two inches thick. It has a smooth brown exterior, and consists of a number of concentric layers, which may be easily distinguished in a transverse section.

The structure of the root is very porous, almost as much so as common cane.

Composition. — Peculiar uncrystallisable principle, *cissampelin*; soft resin; tannin; and starch.

Medicinal properties. — *Bitter tonic.* It is thought also to be *diuretic* and *aperient*, when taken in large doses. Sir B. Brodie says that it undoubtedly diminishes the ropy secretion from the bladder in chronic inflammation of this organ, and he thinks it lessens its irritability. He considers it of more value than uva ursi, which possesses a similar property. He combines it with tincture of hyoscyamus; and when the urine deposits the triple phosphates, which is by no means uncommon in this disease, he adds nitric or muriatic acid. Christison remarks that his own experience and that of his friends does not confirm Brodie's good opinion of the efficacy of this drug.

Uses. — Only in *chronic catarrh or inflammation of the bladder.*

Dose. — f ℥ij to f ℥iv, twice or three times daily.

DECOCTUM PYROLÆ, *D.*

Take of Leaves of winter green, dried, ℥ss.
Water, half a pint.

Boil for ten minutes in a covered vessel, and strain. The product should measure about f ℥viij.

Uses. — See Decoctum Chimaphilæ, p. 263.

DECOCTUM QUERCUS, *L. D. E.*

Decoction of Oak (Bark).

Take of Oak (bark), bruised, ten drachms.
Distilled water, two pints.
Boil down to a pint, and strain.

D. Oak bark, ℥iss; Water, Oiss. Boil ten minutes, and strain.

QUERCUS PEDUNCULATA (Monœcia Polyandria; Cupuliferæ).

Description.— Oak bark is generally gathered between May and July, as it contains more tannic acid in the spring than at a later period of the year. Some pieces of bark are very thick and deeply cracked; whilst others are thin, having been taken from young and small branches. These contain much more tannin than the thick pieces which are separated from the old trunks; and hence ought to be preferred.

Bark for which oak bark may be mistaken. — *Willow bark.* It is not easy to distinguish them by description; but the interior of oak bark is darker coloured, and appears harder than that of willow bark, which has a pale brown colour, and is more yielding to the nail. The cracks and furrows on the exterior of willow bark have more of a *longitudinal* direction than those of oak bark.

Composition.— Oak bark consists *chiefly* of *tannin* or *tannic acid*, with, perhaps, a *small* quantity of *gallic acid*. It is to these principles that it owes its astringency. The characteristic property of tannic acid is to produce an insoluble compound with gelatine. This latter substance exists almost pure in isinglass, and forms the basis of all animal skins. Hence, when oak bark, in water, is left for some time in contact with hides, it forms an insoluble compound with the gelatine, called chemically *tanno-gelatine*, or popularly *leather*. This effect is produced in a degree when oak bark comes in contact with the living tissues, and causes the symptoms which are described as characteristic of the operation of astringents. Tannic acid produces a dark blue colour with the persalts of iron, which is the basis of common ink. It does not produce this colour with protosalts of iron.

Medicinal properties.— *Astringent.*

Uses.—The decoction is principally employed as a gargle in *relaxed sore throat;* or as an injection in *leucorrhœa*, *piles*, and *prolapsus* of the *rectum* or *uterus*. Mr. Lizars recommends that, after a hernia has been reduced, the groin should be bathed three or four times daily, with a warm decoction, before a truss is applied. It is not often used internally. The inhalation of the aroma from the bark is thought to secure tanners against phthysis; and an impalpable powder of the bark has been inhaled in some cases of supposed consumption on this ground. The decoction is sometimes used as a bath for children who are suffering from intermittent fever.

Incompatibles.—Decoction of cinchona, and of most metallic salts; but alum and sulphate of zinc are often combined with the decoction.

DECOCTUM SARZÆ, *L.D.E.*

DECOCTION OF SARSAPARILLA.

Synonyme. Decoctum Sarsaparillæ, *D.*

Take of Sarsaparilla (sliced), five ounces.
Distilled water, boiling, four pints.
Boil down to two pints, and strain.

Macerate for four hours, in a lightly-covered vessel, near the fire, then take out and bruise the sarsaparilla. When bruised, return it to the liquor, and again macerate in like manner for two hours; afterwards boil down to two pints, and strain, *E.*

SMILAX (Diœcia Hexandria; Smilaceæ).

Description.— Sarsaparilla is obtained from several species of Smilax, which are not yet fully known. In their general characters they are creeping or climbing plants, with smooth, twisted, angular stems, which are more or less covered with hard curved spines. The flowers are not known, and the petioles bear two long, smooth tendrils. As generally seen in the shops, sarsaparilla is in pieces about two inches long, and evidently split longitudinally. The split surface is white, and the external one, brown or red. It is difficult, in this form, to distinguish the different varieties.

Varieties.—Jamaica, Lisbon, Brazil, Honduras, and *Lima* or *Valparaiso.*

Jamaica.—This is considered to be the best, and is the most costly, and is made up in bundles about 1 foot or 1½ foot long, and 4 or 5 inches thick. It is much wrinkled longitudinally and is *covered with numerous small root fibres* (*the beard*). Its *colour*, externally, is generally *red or brownish-red*, but this is not always the case. If cut transversely, the outer (cortical) portion is thicker than the central portion (meditullium). Its section has a reddish tinge; and when chewed, it tinges the saliva of this colour.

Lisbon, or Brazil, and *Honduras.*—These are much alike. They are in bundles 2 or 3 feet long, and 1 foot thick. There are fewer longitudinal furrows, and the *small root fibres* (*beard*) *are much less numerous.* Its *colour* is a *dirty brown*, and when it is broken across, a quantity of white powdery starch is scattered about. When cut transversely, the section is nearly white, owing to the large quantity of starch which it contains.

Lima or Valparaiso, resembles the last in general appearance, but is in looser bundles, and contains part of the rhizome (chump), to which are attached the roots which constitute the bundle. There is less starch in this variety than in the last.

Qualities.— The active ingredient is supposed to lie in the cortical part, and those kinds are therefore most valuable which contain the most bark. It is on this account that Jamaica sarsaparilla is preferred, as the beard consists principally of bark. It also yields the largest amount of extract; affording from 33 to 50 per cent., whilst the others furnish only from 20 to 26 per cent. (*Pereira.*)

Composition.— Volatile oil (very small quantity); *smilacin*, a white crystalline substance obtained from the bark; and *starch:* there is much less of this ingredient in Jamaica sarsaparilla than in the other kinds, but it forms a large proportion of the extract from any of the four varieties, especially from the Honduras sarsaparilla.

Medicinal properties.— It is very much disputed whether sarsaparilla has any properties except nutritious ones, derived from the starch. It is asserted by many that its value consists in the absence of mercury during its employment, and the good diet with which it is generally accompanied. Its properties, whatever they may be, are *alterative;* that is to say, it produces a change in the system without exerting any perceptible influence over the secretions or excretions. It is principally esteemed for its restorative powers, when the health has broken up by the combination of syphilis, mercury, and general excesses. Mr. Lawrence remarks that it is esteemed a valuable drug by surgeons generally, and is generally despised by physicians, because it is principally the former who see the cases of disease and impaired health in which it is said to be useful. "It is difficult to say in what way it operates; but when we see men whose constitution appears broken up and their health gone, become fat and healthy, and regain their appetite and strength under its use, whilst they have become worse, or have made no progress under any other plan of treatment, we can scarcely resist the conviction that the amendment has been produced by this medicine."*

Uses. — In *secondary syphilis*, especially if the health is much impaired. In some *obstinate skin diseases*, whether papular, vesicular, pustular, or tubercular, when they occur in enfeebled habits. In the various forms of *cutaneous eruptions, connected with disordered digestion* in children, a cold infusion, made by beating an ounce of sarsaparilla with a pint of lime-water for ten or fifteen minutes, and allowing them to remain in contact for two days, is used with great benefit. In the *diarrhœa of cachectic* infants I frequently employ this infusion mixed with twice its volume of milk with advantage greater than that which I obtain from lime-water alone. In *cachectic states of the system generally*, as chronic abscesses, with profuse discharge; disease of bone; and various strumous affections.

Dose and administration. — Sarsaparilla is seldom given in substance. The dose of the decoction is from f℥ij to f℥vii, two or three times daily.

Officinal preparations. — Decoctum. Decoct. co. Ext. Fluid. Syrup.

DECOCTUM SARZÆ COMPOSITUM, *L. D. E.*

COMPOUND DECOCTION OF SARSAPARILLA.

Synonyme. Decoctum Sarsaparillæ compositum, *D.* Lisbon Diet Drink.

Take of Decoction of Sarsaparilla, boiling, four pints.
Sassafras, sliced,
Guaiacum wood, rasped,
Liquorice (root), fresh, bruised, each, ten drachms.
Mezereon (bark of the root), three (four, *E.*) drachms.

Boil for a quarter of an hour, and strain.

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* Mr. Allanson, Leeds Infirmary.

D. Sarsaparilla-root, sliced, ℥ij; Sassafras-root; Guiacum wood turnings; Liquorice-root, bruised, of each, ʒij; Mezereon-root bark, ʒj, Boiling water, Ojss. Digest all the ingredients with the water in a covered vessel for one hour, then boil for ten minutes, cool and strain. The product should measure a little more than a pint.

Medicinal properties and uses. — It is supposed to be more stimulant and diaphoretic than the simple decoction, which see.

Dose. — f℥j to f℥viii, three or four times daily.

SASSAFRAS, Laurus Sassafras (Enneandria Monogynia; Lauraceæ).

Description. — Sassafras shavings are obtained from the root of the Laurus sassafras. They have a pale yellow colour, resembling that of quassia chips, and a peculiar fragrant odour, by which they are distinguished from all other substances.

Composition. — The wood contains an *aromatic volatile oil*, to which all its properties are due.

Medicinal properties. — *Stimulant; sudorific.* It has an agreeable flavour, and is chiefly valued on this account.

Uses. — It is seldom used alone, but is combined with sarsaparilla or guiacum, in secondary syphilitic, rheumatic, and cutaneous diseases. It should not be given if fever is present.

Dose. — Of the oil ♏ij to ♏x.

MEZEREON, Daphne Mezereum (Octandria Monogynia; Thymelaceæ).

Description. — Mezereon bark is in pieces several inches long, which have been separated from the root by a longitudinal incision. It is brown and slightly corrugated externally; and internally, has a soft, white, cottony appearance. The roots from which it has been separated are between the thickness of a quill and that of the little finger.

Composition. — An *acrid resin*, and a *neutral crystalline* substance (*daphnin*), which Pereira states is not the active principle of the bark. The active principles reside in the bark, and the woody part of the root should therefore be entirely rejected.

Medicinal properties. — *Excessively acrid; diaphoretic;* in large doses, it is poisonous. When chewed, its taste is at first sweetish, afterwards highly acrid. Applied to the skin, it causes irritation, and ultimately vesication. It is liable to disorder the primæ viæ, exciting vomiting and purging. It sometimes produces irritation of the urinary organs, similar to that occasioned by cantharides.

Uses. — In *chronic rheumatism*, secondary *syphilis*, and *cutaneous diseases* it is used as a stimulating diaphoretic. It has been useful, when chewed, in curing difficulty of swallowing, occasioned by paralysis. Soaked in hot vinegar and water, it is applied to the skin for several hours, on the Continent, to produce vesication in some chronic local affections.

Dose and administration.—It is very seldom prescribed alone, but is generally given combined with sarsaparilla. As a masticatory, gr. ij of the bark may be chewed.

Dose of the bark in infusion, gr. j to gr. x.

DECOCTUM SCOPARII COMPOSITUM, *L. D. E.*

Compound Decoction of Broom.

Synonyme. Decoctum Scoparii, *D. E.* Decoctum Spartii compositum.

Take of Broom,
Juniper (bruised),
Dandelion (bruised), each half an ounce.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

D. Broom tops, dried, ℥ss; Water, Oss. Boil to ℥viii.

E. Broom tops and juniper tops, of each, ℥ss; Bitartrate of potash, ʒijss; Water, Ojss. Boil to a pint, and strain.

CYTISUS SCOPARIUS (Diadelphia Decandria; Leguminosæ).

Description.—Broom has elegant yellow flowers, and grows abundantly in all parts of England. Dried broom consists of a bundle of small green sticks, without leaves or flowers.

Composition.—A *concrete volatile oil*, and several *salts of potash, magnesia, lime*, and *iron*.

Medicinal properties.—*Diuretic* and *laxative*. Cullen says that it seldom fails to cause both purging and diuresis; and Pereira adds that he cannot call to mind a single case in which it has failed to act upon the kidneys. It frequently succeeds when many other diuretics have failed.

Uses.—All *dropsies*, except, perhaps, dropsy accompanied with acute inflammation, or dependent upon diseased kidney (*Pereira*). It is, however, prescribed even in the latter case.

Remarks upon the compound decoction.—It is *diuretic* and *laxative*, the juniper increasing the former, and the dandelion the latter property.

It is generally combined with bitartrate of potash, as in the Ph. E.

Dose.—f℥j to f℥ij, several times daily.

Sal genisiæ, or salt of broom, is the saline mass remaining after incinerating broom tops. It consists chiefly of carbonate of potash.

DECOCTUM SENEGÆ, *L. D.*

DECOCTION OF SENEGA.

Take of Senega, ten drachms.
Distilled water, two pints.
Boil down to a pint, and strain.

POLYGALA SENEGA (Diadelphia Octandria; Polygaleæ).

Description.—Senega root varies in thickness from the size of a bristle to that of the little finger. It is twisted, and is terminated by an expanded very irregular summit, to form which, the small fibres adhere. Its colour is grey. The root is frequently marked by deep transverse rings, and a sharp, thin, projecting ridge may be seen running longitudinally down one side.

Roots for which it may be mistaken.—None but *serpentary*, if the small root fibres are still attached. It is distinguished by the absence of smell. If only the thicker part of the root is examined, it may be mistaken for *tormentilla:* this has not the expanded extremity of senega root; and its colour is brown or red, instead of grey. It is also generally more shapeless. *Bistort:* this is much darker externally; and its regular double twist and pink colour when broken transversely, effectually distinguish it. *Ipecacuanha:* this is *much* thinner, more regularly annulated, and has not the expanded summit. *Black hellebore:* this is distinguished by its black colour, and by the numerous straight black fibres attached to it.

Composition.—*Polygalic acid* (*polygalia*), and a *sweetish bitter extractive.* The active principles reside in the bark of the root, and are soluble to a great extent in hot water.

Medicinal properties.—*Acrid* and *stimulant.* In *large* doses, *emetic* and *purgative;* in *small* ones, *diaphoretic*, *diuretic*, and *expectorant.* It causes an increased flow of saliva, and sometimes gastric uneasiness. It exerts a considerable influence over the secretion from the bronchial mucous membrane; and it is on account of its expectorant properties that it is chiefly valued.

Uses.—In the *latter* stages of *bronchitis* and *pneumonia*, in debilitated patients, or when depletion has been carried to its full extent, it is very useful. It causes a diminished and more healthy secretion from the mucous membrane, amends the secretions generally, and gives tone to the system, and its employment is not contra-indicated in these cases by frequency of the pulse, or a febrile condition. It is often advantageously combined with some form of ammonia. It is given with benefit in the *lethargic stage* of *fever*, and it is very useful in chronic *catarrh* and *humoral asthma.* In America, the decoction has been given in small doses until it caused vomiting or purging, in the treatment of *croup.* In *catarrhal oph-*

thalmia and other diseases of the eye, attended with disordered secretion; in *iritis*, when not dependent upon syphilis; and in *hypopion*, at the commencement of the purulent secretion, Dr. Schmalze, of Dresden, has found it very useful. Its employment should be continued until it occasions purging.

Dose. — Of the powdered root (very seldom given), gr. x to ʒj; of the decoction, f℥j to f℥iij, three or four times daily, combined with squill and some form of ammonia, according to circumstances.

DECOCTUM TARAXACI, *L. E.*

Decoction of Dandelion.

Take of Dandelion (root), bruised, four ounces.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

Ed. Taraxacum, herb and root, fresh, ℥vii; Water, Oii. Boil to a pint.

Medicinal properties and uses. — *Laxative*, *diuretic*, and *alterative*. It is given with advantage in dropsy as a vehicle for cream of tartar, or other diuretics; and in jaundice, combined with spirit of nitric ether. It is useful in congestion of the liver, whether accompanied by jaundice or not.

Dose.—f℥iv to f℥viii, or almost ad libitum in the day.

DECOCTUM TORMENTILLÆ, *L.*

Decoction of Tormentilla.

Take of Tormentilla, bruised, two ounces.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

POTENTILLA TORMENTILLA (Icosandria Polygynia; Rosaceæ, sub-ord. Roseæ).

Description.—Tormentilla root is very irregular, and appears like a number of roundish or oblong knobs joined together. Its colour is deep reddish-brown externally, and flesh-red internally.

Roots for which it may be mistaken. — *Senega*, which is grey externally, annulated, and terminated by an expanded summit. *Bistort*, which is deeper red, and the roots of which are bent twice, and have a peculiar pink colour when broken transversely. *Hellebore*, which is black, externally, and has many straight black root fibres.

Composition. — *Tannic acid.*

Properties. — Powerfully *astringent.*

Uses. — Chronic *diarrhœa* and *dysentery*; for which it is as useful as kino or catechu. The employment of the decoction has been followed by diminution of the palpitation and general discomfort of the patient, in some cases of *hypertrophy* of the *heart* dependent upon valvular disease, in which no particular plan of treatment was indicated. It is not disagreeable in its flavour to children, when given with milk, as diet in chronic diarrhœa.

The natural order Rosaceæ, sub-ord. Roseæ, to which tormentilla belongs, is characterised by its astringent properties and by its freedom from producing any injurious effects when used for a length of time,—a circumstance of importance in chronic diarrhœa. The bramble also belongs to the same order, and I have known obstinate diarrhœa which had resisted other treatment yield to decoction of bramble leaves.

Dose. — f ℥j to f ℥iij.

DECOCTUM ULMI, *L.*

Decoction of Elm (Bark).

Take of Elm (bark), bruised, two ounces and a half.
Distilled water, two pints.
Boil down to a pint, and strain.

ULMUS CAMPESTRIS (Pentandria Digynia; Ulmaceæ).

Description. — Elm bark is in thin broad twisted pieces, in which the peculiar character of the grain of the wood may frequently be traced. Its colour is reddish-brown.

Composition. — *Tannic acid*, in small proportion; *ulmic acid*; and *mucus*.

Medicinal properties. — *Mild astringent*; mucilaginous *tonic.* In large doses, the decoction is *diaphoretic.*

Uses. — Elm bark has been employed with benefit, in several *herpetic* eruptions; and it has been thought to have cured a severe case of *ichthyosis*. I have used it extensively in combination with fifteen-grain doses of acetate of potash in *chronic eczema*, and *scabies*, and have found so much benefit from its employment as to have increasing confidence in its value. Dr. A. T. Thomson says he has long been in the habit of prescribing the decoction instead of sarsaparilla.

Dose. — Of the decoction, in which form alone it is administered, f ℥ii to f ℥vi, three or four times daily.

DECOCTUM UVÆ URSI, *L.D.*

DECOCTION OF BEARBERRY.

Take of Bearberry (leaves), bruised, an ounce.
Distilled water, a pint and a half.
Boil down to a pint, and strain.

D. Take of Uva Ursi leaves, ℥ss; Water, Oss. Boil ten minutes, and strain.

ARCTOSTAPHYLOS UVA URSI (Decandria Monogynia; Ericaceæ.)

Description.—Uva ursi leaves are ovate, and pointed at each end, though the apex is not so acute as the base. They have a dark green colour, and are rigid. Their under-surface is much reticulated, and the edges are entire.

Leaves for which it may be mistaken.—See INF. SENNÆ COMP.

Composition.—Chiefly *tannic acid*, with a small quantity of *gallic acid*, and some salts of *soda* and *lime*.

Medicinal properties.—*Astringent*, and slightly *diuretic*. It exerts its astringent powers chiefly upon the urinary organs. Its astringent and colouring principles have been detected in the urine.

Uses.—Principally in *chronic catarrh of the bladder*, in which it is thought to be very useful. Dr. Prout says, that if combined with hyoscyamus, and taken for *a considerable time*, it generally diminishes the irritability of the bladder and the quantity of mucus secreted, and so mitigates the sufferings of the patient. Sir B. Brodie, on the other hand, says that he has been frequently disappointed by its failure in these cases. I have not had sufficient experience to speak with confidence myself as to its effects in this disease; but in irritability of the bladder, indicated by frequent micturition, though unaccompanied by an excessive secretion of mucus, I have found it produce relief when given with soda and hyoscyamus, greater than was obtained from these two medicines without the uva ursi. Pereira finds that its employment is sometimes followed by great relief, whilst in other cases it entirely fails. It was recommended by Dr. Haen as lessening the secretion of mucus and the irritability of the bladder in calculous affections.

Dose.—The powder is a disagreeable form; its dose is ℈ss to ʒj, in milk, twice or thrice daily. The decoction is liable to nauseate the stomach. Its dose, f℥j to f℥iij, three times daily. The extract is, perhaps, the best form; dose, gr. v to gr. xv, combined with hyoscyamus.

EMPLASTRA.

PLASTERS.

Considerable difficulty is frequently experienced in cleansing the skin after the removal of a plaster, and soap and water are nearly ineffectual for this purpose. If the skin is gently rubbed for a few seconds with oil of turpentine and a piece of linen, the whole of the adhering plaster is immediately removed, and all the stickiness disappears.

CHLOROPERCHA. (Not Off.)

Take of Gutta percha, in small slices, ʒi.
Chloroform, f℥i.
Shake them well together occasionally for four or five hours.

Remarks. — I have ventured to give the above name to a substance which is commonly prepared by druggists, but which has hitherto been without any special designation. There is no authorised formula, and the above quantities may be varied according to the object for which it is required. The gutta percha does not dissolve in the chloroform, but it very quickly softens and swells up, and when shaken with the remaining fluid, forms a dark brown semi-liquid mixture. On standing at rest the ingredients separate again, the gutta percha rising to the surface; but they readily mix again when again shaken together. If it becomes too thick from the evaporation of the chloroform, it can be remedied by the addition of a little more. It is much less volatile than collodion, and may be easily kept in a common corked bottle.

Medicinal properties and uses. — When applied to the skin, the chloroform rapidly evaporates and leaves a thin film of gutta percha, which effectually protects the surface covered by it from the air. If applied to an open wound, it causes a momentary smarting. The purposes for which it is used are similar to those for which collodion is employed (see Collodion, p. 284), but it does not form so firm a covering, and consequently it is not so available in the treatment of entropion. In superficial wounds, and scratches, and in slight erysipelas, they may be used indifferently. Chloropercha is sometimes used for stopping carious teeth, in which case the proportion of gutta percha should be greater than that which is ordered above.

COLLODION (Not Off.)

Take of Gun cotton or xyloïdine, thirty grains.
Commercial æther (sp. gr. not lower than ·760 or ·770), an ounce.

Shake them frequently together, and keep them in a very carefully stopped bottle.

Remarks. — Gun cotton will not dissolve in pure æther; and if none but the pure article is at hand, it must be mixed with a little alcohol so as to raise it to about ·760 or ·770. The cotton then dissolves readily.*

It is exceedingly difficult to prevent the æther from evaporating, and leaving the gun cotton as a solid mass at the bottom of the bottle. If the cotton cannot be obtained ready prepared, it may be made by the following process; and as the film of cotton is inelastic, it sometimes separates from the skin, owing to motion in the parts which it covers. To remedy this inconvenience, various plans have been proposed, and the following formula has been given, not only for preparing the gun cotton itself, but for making elastic collodion.

ELASTIC COLLODION.

Take of Sulphuric acid (sp. gr. 1·847) 300 grains.
Nitrate of potash, very dry, 200 grains.

Mix in a stone ware mortar, and add of carded cotton 10 grains. Leave them in contact for twelve minutes, withdraw the cotton, wash it with cold water till it ceases to be acid, and immerse it in 1000 grains of water, in which 30 grains of carbonate of potash have been dissolved. Remove it, and again wash it well, and dry it at a temperature not above 86° or 90° F.

Then take of this cotton 8 grains; common sulphuric æther 125 grains; place them in a wide-mouthed flask, and add of alcohol (sp. gr. ·825) 8 grains. Agitate them, and then make a mixture of Venice turpentine, castor oil, and white wax, of each 2 grains, æther 6 grains. Heat together the first three substances, add the æther, and combine the two mixtures.†

Medicinal properties and uses.—This substance and chloropercha can scarcely be called plasters with propriety, although they answer many of the purposes of such remedies. They form a valuable application to superficial wounds, such as extensive scratches from falls from horseback, &c.; and a variety of uses of a similar nature will at once suggest themselves to the surgeon. But one of the most important purposes to which collodion is applied is in the treatment of *erysipelas*. The free application of this agent sometimes acts beneficially, by reducing the congestion of the vessels by the contraction which it produces as it dries and shrinks. It acts in fact upon the same principle as a carefully and firmly applied bandage upon an erysipelatous limb, or as tight strapping to a swelled testicle. In all these cases the dilated vessels are mechanically emptied, and their enfeebled coats supported until they have regained sufficient health and tone to enable them to perform their own duty unaided. Having observed the utility of the salts of iron in erysipelas, M. Aran combined equal parts of collodion and ethereal tincture of perchloride of iron. When spread on the skin it forms a thinner and more elastic covering than collodion alone, and does not crack when the limb is moved. In some cases of *chronic congestion* of the *capillaries* remaining after an attack of erysipelas, or of any cutaneous affection which has left the vessels weak, the disagreeable redness is removed for the time, and, by the repeated application of the collodion, eventually cured, upon the same principle. In *Herpes preputialis and labialis*, *chapped hands*, and numerous skin diseases, collodion has also been used with good effect. In *entropium*, or inversion of the eye-lids, it has been used with varying success, the diversity depending upon the amount of lachrymal secretion. The loose skin of the cheek, or of the upper lid, as the case may be, is to be drawn together until the lid is fairly everted, and the collodion must then be freely applied until it forms a firm thick layer. If the tears are carried off by the punctæ, this will adhere, and relief, at any rate, if not eventually a perfect cure, will be obtained; but if the tears run over the face the collodion speedily becomes moist and loosened from the skin, and no good is effected. In all such cases, therefore, the lachrymal passages must be placed in as healthy a condition as possible, previous to employing this remedy in this intractible disease. In *chronic inflammation of the epididymis*, it has been proposed on the same grounds as in erysipelas by Dr. Lange of Königsberg. He was induced to try pencilling the scrotum with collodion, and it was of service. "In three cases a single application sufficed, and recovery took place in three, four, or six days. The fourth, a man who practised onanism, suffered from swelling of the testicle for six weeks, with slight œdema of the scrotum. He was cured in seven days by two applications. The fifth patient had suffered from orchitis for six months, and was cured in eleven days after three applications."—*Med. Times and Gaz.*, May, 1853, p. 506.

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* Edwards, Ph. Journ. vol. viii. May, 1849, p. 525.

† Lauras, Ph. Journ. vol. xii. Dec. 1852, p. 303.

EMPLASTRUM AMMONIACI, *L. D. E.*

PLASTER OF AMMONIACUM.

Take of Ammoniacum, prepared, five ounces.
Diluted acetic acid, eight fluid ounces.

D. Ammoniacum, ℥iv; Proof spirit, f℥v.

Dissolve the ammoniacum in the acid (spirit, *D.*); then evaporate the liquor, with a slow fire, constantly stirring, to a proper consistence.

Medicinal uses.—*Stimulant* and *discutient*; applied to scrofulous tumours, chronic swellings of the joints, housemaid's knee, &c. It sometimes causes an eruption, which does no harm in these cases.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO, *L.D.E.*

PLASTER OF AMMONIACUM WITH MERCURY.

Take of Ammoniacum, prepared, a pound.
Mercury, three ounces.
Olive oil, a fluid drachm.
Sulphur, eight grains.

To the heated oil, gradually add the sulphur, stirring constantly with a spatula, until they incorporate; then rub the mercury with them, until globules are no longer visible; lastly, the ammoniacum being melted, and added, by degrees, mix them all.

D. Ammoniac plaster, ℥iv; Mercurial plaster, ℥viij. Melt together.

Medicinal uses.—Similar to the former, but more powerful, especially in venereal nodes and buboes.

EMPLASTRUM ASSAFŒTIDÆ, *E.*

ASSAFŒTIDA PLASTER.

Take of Litharge plaster and assafœtida, of each, two ounces.
Galbanum and bees' wax, of each, one ounce.

Liquefy the gum resins together, and strain them; then add the plaster and wax, also in a fluid state, and mix them all thoroughly.

Uses.— A stimulant discutient plaster to chronic swellings.

EMPLASTRUM BELLADONNÆ, *L.D.E.*

PLASTER OF DEADLY NIGHTSHADE.

Take of Soap plaster.
Extract of Belladonna, of each, three ounces.

To the plaster, melted with the heat of a water-bath, add the extract, and mix, constantly stirring until they have a proper consistence.

E. and *D.* Ext. Belladonna, ℥j; Resin plaster, ℥ij. Melt, and mix as above.

Medicinal uses.— *Anodyne* and *antispasmodic.* Applied to the sacrum, it relieves pain in *dysmenorrhœa.* Dr. Churchill finds it very efficient in soothing the pain of *irritable uterus*, if it is applied above the pubes.* Applied to the region of the heart, it allays the violent palpitation which sometimes occurs, without pericarditis, towards the end of an attack of acute rheumatism; or which may be occasioned by hysteria or other causes.

EMPLASTRUM CALEFACIENS, *D.*

WARMING PLASTER.

Take of Plaster of Spanish flies, half a pound.
Burgundy pitch, five pounds and a half.
Melt them together.

Uses.— In chronic rheumatic pains.

EMPLASTRUM CANTHARIDIS, *L. D. E.*

CANTHARIDES PLASTER, OR PLASTER OF SPANISH FLIES.

Synonyme. Empl. Epispasticum. Empl. Lyttæ. Empl. Vesicatorium.

Take of Cantharides, rubbed to a very fine powder, a pound.
Wax,
Mutton suet, of each, seven ounces and a half.
Resin, three ounces.
Lard, six ounces.

Add the resin, first melted, to the wax, the suet, and the lard, melted together. Then remove them all from the fire, and a little before they become solid, stir in the cantharides and mix them.

D. Spanish flies, ℥vi.; Yellow wax, resin, and lard, of each, ℥iv.

E. Cantharides, resin, bees' wax, and suet, of each, ℥ij. Proceed as above.

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* Lancet, 1839-40, vol. ii. p. 273.

EMPLASTRUM CANTHARIDIS COMPOSITUM, *E.*

COMPOUND BLISTERING PLASTER.

Take of Venice turpentine, four ounces and a half.
Burgundy pitch and cantharides, of each, three ounces.
Bees' wax, one ounce.
Verdigris, half an ounce.
White mustard seed and black pepper, of each, two drachms.

Liquefy the wax and Burgundy pitch; add the turpentine, and while the mixture is hot, sprinkle into it the remaining articles, previously in fine powder and mixed together. Stir the whole briskly as it concretes in cooling.

Uses.—The addition of the other substances is supposed to render this plaster more certain in its effects.

Remarks upon the Emplastrum cantharidis.—The oleaginous principles of the plaster combine chemically with the cantharidin, and therefore heat may be beneficially applied; but it should be moderate, as this principle is volatile (*Christison Dispensatory*). Donovan, on the contrary, says that the heat should *not* be moderate, and that the temperature of boiling oil is beneficial rather than injurious, as the active principle is thus more entirely dissolved by the oil. He states that blistering plaster, which he made at a high temperature, was considerably more active and efficient than that made at a moderate heat. I have myself long been convinced, from experience, that a heat much above that usually thought admissible, is not detrimental to the activity of the plaster. There are various active solutions of cantharidin, and thin paper soaked in them, and used instead of this plaster, is more elegant and convenient, and less disagreeable. The plaster should not generally be retained more than twelve hours, and for an infant or young child, not above two to six hours, and a poultice should afterwards be applied to the little patient.

CANTHARIDES.

Description and varieties.—Cantharides are characterised by the brilliant green or coppery-green colour of their wing scales. They are sometimes, when entire, adulterated with the golden beetle, which is much broader in proportion than the true Spanish fly; or, when powdered, with euphorbium. This latter fraud is detected with difficulty, and its presence is said to increase the pain of the blistering plaster, without augmenting its efficacy. The insects, whilst alive, become sluggish towards evening, and are then shaken off the trees into a cloth, and killed by exposure to the vapour of acetic acid, or of oil of turpentine. They are commonly called Spanish flies; but are now brought in great numbers from St. Petersburgh, Sicily, and Astracan. They are liable to be attacked by an insect, which eats the greater portion of them; but which does *not* (*Thomson, Lond. Dispensatory*), which *does* (*Christison, Dispensatory*), devour also their active principle. They are best preserved in dry well-stopped bottles; and the addition of a small quantity of carbonate of ammonia is useful for this purpose (*Christison*). They ought not to be kept in the state of powder.

Composition.— Their active ingredient is *cantharidin*, which is a crystalline substance, and volatile at a heat above 212° F. It is probably a solid oil (*Pereira*). It is soluble in hot alcohol, oils, and æther, but especially in the latter, and possesses all the active principles of the insect. Cantharidin, when isolated, is not soluble in water, cold alcohol, or in acetic acid; but whilst in its natural combination in the insect it is dissolved by all these menstrua; each of which is accordingly used in the Pharmacopœia.

Tests.— It is sometimes important to prove the presence of cantharides, for medico-legal purposes. The wing scales may remain long in the stomach without being affected; and they have even been distinguished by their shining green particles, nine months after interment of the body. These are not, however, sufficient to prove its presence. Pereira says that the contents of the stomach, or suspected solid matters are to be digested several times in æther, and the clear solutions being poured off, or separated by filtration, are to be evaporated to dryness. The extract obtained is to be applied to the inside of the lip, and it will raise a blister, if cantharides are present.

Medicinal properties.— Acro-narcotic; diuretic; vesicant; emmenagogue; aphrodisiac? When taken in large or poisonous doses, cantharides excites inflammation of the alimentary canal, and of the urinary organs; ptyalism, excessive abdominal tenderness, bloody stools, horrible griping, strangury, bloody urine, or suppression of this excretion; headache, delirium, convulsions, and coma. Even when applied externally, it sometimes causes severe strangury. This used to be much more common formerly than at present, as a blistering plaster was generally kept on for twenty-four hours, whilst it is now seldom retained more than twelve or eighteen hours. Taken internally in small doses, it excites irritation of the urinary organs, and sometimes copious diuresis. Christison, however, finds this effect generally feeble and uncertain (*Dispensatory*). It stimulates the bladder, and induces frequent micturition. It sometimes checks excessive mucous discharges from the urinary organs. Its aphrodisiac powers are very uncertain, and are not often manifested except in poisonous doses. It has been used to cause abortion; but its effects are very uncertain, and so dangerous that it has occasioned death in several instances. Locally applied, cantharides causes at first redness and pain, and ultimately vesication; but sometimes the skin seems almost unsusceptible of this effect. In this case, the previous application of a mustard poultice, or fomenting the skin with hot water, enables it to act more effectually. In some irritable skins, and in very low states of the system, as in typhus, severe sloughing sometimes follows the application of a blistering plaster; and this effect is very liable to occur after scarlatina, on which account we should be very guarded in their use after this disease. Occasionally, the mark left after a common blister remains for some weeks: but it ultimately disappears. The strangury which is sometimes occasioned is best relieved by very copious draughts of barley water, or some mucilaginous drink, and a little sweet spirit of nitre. It is a mistake to suppose that camphor is a specific for this painful accompaniment of the blister. The strangury may, however, be often prevented by placing a piece of very thin silver paper, soaked in vinegar, between the plaster and the skin, and by not keeping it on too long. If it can be avoided, a blister should not be applied upon a part which has been newly shaved, as the skin in such cases is sometimes very sensitive.

Antidotes.— None specific. Bleeding, emetics, diluents, and the general treatment necessary to subdue inflammation.

Uses. — In *dropsies*, the tincture has sometimes done good. It should be avoided when there is any renal irritation, as in *albuminuria*, until all the acute symptoms have been subdued, by local depletion and other appropriate treatment, such as hot baths, diaphoretics, and hydragogue cathartics, after which it is frequently of considerable service. It should, however, be discontinued if the quantity of albumen is increased during its employment. It has been recommended also in the latter stages of *hydrocephalus* by Dr. Williams, who has seen children recover, under its use, in apparently the last stages of this intractable disease, after other remedies have been tried without avail. In *indolent ulcers* (see TINCT. CANTH.). In *incontinence of urine*, which is not very uncommon in children, and in *paralysis of the bladder*, it has been beneficially taken internally. A blister may be applied to the loins in hysterical retention of urine. In some obstinate *gleets*, Pereira finds the combination of tinctura ferri sesquichloridi and tinctura cantharidis the most efficient form. In *inflammation* of almost every organ, blisters are applied after the more active symptoms are subdued by previous depletion. They seldom do much good if applied before depletion has been employed; but in the various inflammatory complications of fever in towns, previous bleeding is generally omitted, as the inhabitants frequently cannot bear the loss of blood. In *erysipelas*, blisters are sometimes applied in order to localise the inflammation; and, in *erysipelas of the head*, they are applied to the extremities, on the principles of counter-irritation or revulsion. In *chronic inflammations of the joints, of the eye, or of other parts*, perpetual blisters are often employed; *i. e.* the blistered surface is prevented from healing by being dressed with savine or cantharides ointment. A blister to the perinæum is sometimes useful in gleets. It is not now believed that the efficacy of a blister depends upon the quantity of serum removed, but upon the amount of inflammation induced. Sometimes, after the application of the blistering plaster, a vesicle does not rise until a poultice has been kept upon the skin for a few hours.

EMPLASTRUM CUMINI, *L.*

Cumin Plaster.

Take of Cumin, caraway, laurel berries, wax, of each, three ounces.
Burgundy pitch, prepared, three pounds.
Olive oil, water, of each, a fluid ounce and a half.

To the pitch and wax melted together, add the dry ingredients rubbed to a powder, the oil, and the water; then evaporate to a proper consistence.

This is a stimulant, detergent plaster, and is applied to languid ulcers, which require stimulating.

EMPLASTRUM FERRI, *L. D. E.*

Steel Plaster.

Synonyme. Empl. Thuris. Empl. Roborans.

Take of Sesquioxide of iron, one ounce.
Frankincense, prepared (Burgundy pitch, *D.*), two ounces.
Lead plaster, eight ounces.

E. Lead plaster, ℥iij; Resin, ʒvj; Olive oil, fʒiijss; Bees' wax, ʒiij; Red oxide of iron, ℥j.

Sprinkle the sesquioxide into the plaster and the frankincense melted together over a slow fire, and mix.

EMPLASTRUM GALBANI, *L.*

Plaster of Galbanum.

Take of Galbanum, prepared, eight ounces.
Plaster of lead, three pounds.
Turpentine, one ounce.
Frankincense (resin of the spruce fir), prepared, three ounces.

To the galbanum and turpentine, melted together, first add the frankincense, then the plaster, melted with a slow fire, and mix them all.

Medicinal uses.—Stimulant; discutient. It is serviceable in cases of indolent glandular enlargements of a strumous character, and is also applied to the chest in chronic pulmonary complaints, and to the loins in rickety children, as a support to the lower extremities.

EMPLASTRUM GUMMOSUM, *E.*

GUM PLASTER.

Take of Litharge plaster, four ounces.
Ammoniac, galbanum, and bees' wax, of each, half an ounce.
Melt together, and mix.

Medicinal uses.—The same as Emp. Galbani.

EMPLASTRUM HYDRARGYRI, *L. D. E.*

MERCURIAL PLASTER.

Take of Mercury, three ounces.
Plaster of lead, a pound.
Olive oil, a fluid drachm.
Sulphur, eight grains.

To the heated oil add the sulphur gradually, stirring constantly with a spatula until they incorporate; afterwards rub the mercury with them, until globules are no longer visible; then gradually add the plaster melted with a slow fire, and mix them all.

D. Mercury, ℥vi; Resin, ℥ij; Oil of turpentine, f℥j; Litharge plaster, ℥xii. Dissolve the resin in the turpentine with the aid of heat, add the mercury, and rub them together until metallic globules cease to be visible, and the mixture assumes a dark grey colour, then add the litharge plaster, previously melted, and stir the mixture constantly until it stiffens on cooling.

E. Mercury, ℥iij; Olive oil, fʒix; Resin, ℥j; Litharge plaster, ℥vi. Liquefy together the oil and resin, rub in the mercury, and proceed as above in the *Ph. D.*

Medicinal uses.—Alterative; discutient. It is less powerful than the emplastrum ammoniaci cum hydrargyro. The addition of the sulphur causes the extinction of the mercury more quickly than if fatty matters alone are used. The greater part of the mercury is probably only mechanically divided. Some of it is in the state of sulphuret. It is still disputed whether much or any of it becomes oxidised.

EMPL. LYTHARGYRI, *D. E.*, see EMPL. PLUMBI.

D. Litharge in very fine powder, ℔v; Olive oil, cong.; Water, Oii.

E. Litharge in fine powder, ℥v; Olive oil, f℥xii; Water, f℥iii. Boil all together, constantly stirring till the oil and litharge unite, replacing the water if it evaporate too fast.

EMPLASTRUM OPII, *L. D. E.*

OPIUM PLASTER.

Take of Extract of opium, an ounce.
Frankincense (resin of the spruce fir) prepared, two ounces.
Plaster of lead, eight ounces.
Boiling water, one fluid ounce.

To the melted frankincense add the plaster melted with a slow fire, and the extract first mixed with the water: and evaporate with a gentle heat, constantly stirring, to a suitable consistence.

D. Opium in very fine powder, ℥j; Resin plaster, ℥ix.

E. Powdered opium, ℥ss; Burgundy pitch, ℥iij; Litharge plaster, ℥xii.

Medicinal uses.—*Anodyne;* but it is doubtful whether it really possesses any power beyond that of protecting the skin from friction and irritation.

EMPLASTRUM PICIS, *L. E.*

PITCH PLASTER.

Synonyme. Emplastrum Picis Burgundicæ.

Take of Burgundy pitch, prepared, two pounds.
Frankincense, prepared, a pound.
Resin, wax, each four ounces.
Expressed oil of nutmegs, an ounce.
Olive oil, water, each, two fluid ounces.

To the frankincense, pitch, resin, and wax melted together, add the oils and the water. Lastly, evaporate them all, constantly stirring, to a proper consistence.

E. Burgundy pitch, ℔iss; Resin, Bees' wax, each ℥ii; Oil of Mace, ℥ss; Olive oil, Water, each ℥i. Melt together.

Description.—Burgundy pitch is obtained by melting common frankincense (Abietis resina; Thus) in hot water and straining it through a coarse cloth, by which means some volatile oil and the impurities are removed. It is a brownish-yellow solid, which has a slight and agreeable odour, and readily takes the form of the vessel in which it is kept.

Frankincense (Thus; Abietis resina), or the resin of the spruce fir, is a spontaneous exudation from the Abies excelsa. It has a yellow colour and an agreeable odour, and generally contains fragments of wood broken from the tree when the resin is scraped off. It is brittle, but yields to the finger when pressed.

Substances for which it may be mistaken.—Frankincense is liable to be confounded with elemi, from which it is not always easy to distinguish it. It is stated that the elemi, which comes from Holland, is nothing but common frankincense. Burgundy pitch is not very likely to be mistaken for any thing else.

Adulterations.—The Burgundy pitch of the shops is generally an artificial compound of common resin, water, and palm oil. Sometimes it is made from old American turpentine.

Medicinal properties and uses.—Burgundy pitch forms a very tenacious plaster, which, if long worn, produces great itching, and at length considerable pustular eruption. It is never used internally. Externally, as a counter-irritant, it is applied to the chest in the form of plaster to remove chronic coughs; it is also applied to the loins in lumbago, and to the joints in some chronic articular affections.

EMPLASTRUM PLUMBI, *L.*

LEAD PLASTER.

Synonyme. Diachylon Simplex.

Take of Oxide of lead, rubbed to very fine powder, six pounds.
Olive oil, a gallon.
Water, two pints.

Boil them together with a slow fire, constantly stirring, until the oil and oxide of lead unite into the consistence of a melted plaster; but it will be proper to add a little boiling water, if nearly the whole of that which was used in the beginning should be evaporated before the end of the boiling.

Remarks. — In this preparation the oxide of lead acts the part of an alkali or base towards the oil, converting it into margaric and oleic acids (see SAPONES), which combine with the oxide of lead, and form the emplastrum plumbi, which is, therefore, essentially a *soap*, with a metallic instead of an alkaline basis.

Properties and uses. — It enters largely into the composition of many other plasters, and is a common application to excoriations, and for retaining the edges of fresh-cut wounds in a state of apposition, and defending them from the air. For this latter purpose it is, however, scarcely sufficiently adhesive.

EMPLASTRUM POTASSII IODIDI, *L.*

PLASTER OF IODIDE OF POTASSIUM.

Take of Iodide of potassium, an ounce.
Frankincense, prepared, six ounces.
Wax, six drachms.
Olive oil, two fluid drachms.

To the frankincense and wax melted together add the iodide, first rubbed with the oil, and stir diligently until they are cold. This plaster is to be spread on linen rather than leather.

Medicinal uses. — The plaster is to be applied to indolent scrofulous tumours, or chronic enlargements, nodes, &c.

EMPLASTRUM RESINÆ, *L. D. E.*

RESIN PLASTER.

Synonyme. Emplastrum Resinosum, *E.* Emplastrum Commune Adhæsivum. Emplastrum Saponis compositum, *D.*

Take of Resin, half a pound (℥j, *E.*).
Lead plaster, three pounds (℥v, *E.*).

To the plaster, melted with a slow fire, add the resin first melted, and mix.

D. Resin, ℥iv; Litharge plaster, ℔ij; Castile soap, in powder, ℥ij.

Medicinal uses. — *Stimulant; adhesive.* It is the most common form of sticking plaster, being more adhesive than the lead plaster. It irritates some peculiarly tender skins.

EMPLASTRUM SAPONIS, *L. D. E.*

Soap Plaster.

Take of Soap, sliced, half a pound.
Lead plaster, three pounds.
Resin, one ounce.

The plaster being melted over a slow fire, add the soap and resin fresh melted; then boil all down to a proper consistence, constantly stirring.

E. Litharge plaster, ℥iv; Gum plaster, ℥ij; Castile soap, in shavings, ℥j.

D. Castile soap in powder, ℥iv; Litharge plaster, ℔iiss.

Remarks. — The resin is introduced into this formula in the present Pharmacopœia in order to render the plaster somewhat more adhesive, and to diminish its too great brittleness.

Medicinal uses. — Soap plaster is merely used as an unirritating support in cases of fractured limbs, and for other similar purposes.

EMPLASTRUM SAPONIS COMPOSITUM, *D.*, see Empl. Resinæ.

EMPLASTRUM SIMPLEX, *E.*

Simple Plaster.

Take of Bees' wax, ℥iii; Suet, and Resin, of each, ℥ii. Melt them together, and stir.

ENEMATA.

ENEMAS (GLYSTERS).

Remarks.—Purgative or demulcent enemas should possess a temperature of about 94° F. or 96° F. If lower than this they will feel cool, and not act so efficaciously.

ENEMA ALOËS, *L.*

ALOES GLYSTER.

Take of Aloes, two scruples.
Carbonate of potash, fifteen grains.
Decoction of barley, half a pint.
Mix, and rub them together.

Remarks.—The carbonate of potash is here used, in order to dissolve the resin of the aloes.

Medicinal uses.—It is employed for dislodging ascarides from the rectum, and likewise as a stimulant in constipation attendant upon amenorrhœa, or any other circumstance in which there is no inflammation of the bowels.

ENEMA ANODYNUM, *E.*

ANODYNE GLYSTER.

Take of Decoction of starch, f℥ii.
Tincture of opium, fʒss to fʒj.
Mix.

Properties and uses.—See ENEMA OPII. p. 300.

ENEMA AQUÆ FRIGIDÆ. (Not Off.)

ENEMA OF SIMPLE COLD WATER.

Dr. J. P. Garvin has found this enema of great service, in obstinate cases of *internal piles.* A few ounces (4 to 8) of *cold* water may be thrown into the rectum by means of a common two-ounce syringe with a curved pipe, or an elastic india rubber bottle, immediately before *every attempt* to empty the bowels, and should, if possible, be retained a few minutes, after which the fæces pass in a softened state, "without the least straining or irritation. It is very important to urge upon the patient the continuance of the enemas for some time after he feels as if cured, in order to prevent a relapse; but so decided is the relief afforded, that few persons would be disposed to abandon it, if it were not for the inconvenience of using the apparatus. Active purgation must be carefully avoided."[*]

ENEMA ASSAFŒTIDÆ, *L.*

Assafœtida Glyster.

Take of Assafœtida, prepared, a drachm.
Barley water, half a pint.

Rub the assafœtida with the decoction (barley water) added by degrees, until they are well mixed.

Remarks.—The quantity of barley water is too small, as a considerable amount of fluid is generally necessary to stimulate the bowels to act, so as to return the glyster. A pint at least is the smallest quantity which will generally act sufficiently. This glyster may be much more conveniently made by adding two drachms of fœtid spirit of ammonia to a pint of common gruel.

Medicinal uses.—To expel flatus and empty the bowels in the constipation of hysterical women.

ASSAFŒTIDA, Ferula Assafœtida (Pentandria Digynia; Umbelliferæ).

Description and varieties.—Assafœtida is obtained from incisions in the roots of this plant. At the beginning of the summer, the earth is dug away from about them, and the plant is cut down level with the ground. The root is then sliced transversely, and covered up to protect it from the sun. The juice (assafœtida) exudes and dries. In a day or two it is scraped off, and another incision made below the last.

Assafœtida occurs both in separate tears and in lumps, which may be seen sometimes to consist of agglutinated tears. It is generally hard, but is sometimes as soft as a stiff extract. It has a peculiar, and to most people very disagreeable odour; and it has a very characteristic pink or plum colour, when a fresh cut surface has been exposed for a short time to the light. This colour is permanent.

It is partially soluble in alcohol and æther, and though not soluble in water, is capable of forming an emulsion when triturated with it. It is powdered with difficulty unless mixed with a little carbonate of potash.

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[*] Ranking's Abs. vol. xiv. p. 133.

Substances for which it may be mistaken. — *Galbanum* or *sagapenum.* It is distinguished from both by its powerful odour, and by the pink colour of its cut surface.

Medicinal properties. — Assafœtida is the most powerful of the gum-resins, and is *antispasmodic*, *stimulant*, and *laxative*. It increases the pulse and animal heat, and frequently causes headache and giddiness. It is liable to disorder the digestive organs if there is a disposition to inflammation of the mucous membrane. It has a remarkable power in controlling spasmodic affections, and those convulsive disorders which arise from causes independent of disease in the nervous centres themselves. According to Dr. M. Hall, it acts through the *excitor* nerves, whilst its effects are manifested through the *motor* nerves. Assafœtida causes disagreeable eructations and occasions the expulsion of flatus from the intestines, and quickens the peristaltic action of the bowels.

Uses. — Assafœtida is most valuable in *hysteria*, and is much used to relieve the acute spasmodic pains so common in this disease, and to relieve the bowels from the habitual state of flatulent constipation. In *flatulent colic*, and in the flatulence which occurs in some cases of peritonitis, it is employed with advantage as an enema. In *infantile convulsions*, it is useful as a glyster. In *hooping cough*, it has been found beneficial, but its offensive taste is a great objection. Pereira has often found it of great service in the *chronic catarrh of old people*, when the cough assumes a spasmodic character; and in the *catarrh of young persons*, which is sometimes accompanied by great sweating and loss of flesh. In *chlorosis*, as an emmenagogue, it often disappoints us. It is much used by the Eastern nations as a condiment.

Composition. — *Volatile oil*, which contains sulphur. Hence if the pil. galb. co. is folded in silver leaf to conceal the taste, the leaf is blackened. *Resin* and *gum;* which latter suspends the resin in water when rubbed up with it.

Dose. — Gr. ij to gr. vi.

ENEMA CATHARTICUM, *D. E.*

CATHARTIC ENEMA.

D. Take of Sulphate of magnesia, one ounce.
Olive oil, one fluid ounce.
Barley water, sixteen fluid ounces.

E. Sulph. magnes. ℥ss; Sugar, ℥j; Senna, ℥ss; Olive oil, f℥j; Boiling water, ℥xvj.

Infuse the senna for an hour, dissolve the salts and sugar, add the oil, and mix.

Medicinal uses. — This is a common and useful glyster in obstinate constipation.

ENEMA COLOCYNTHIDIS, *L.*

Colocynth Enema.

Take of Extract of colocynth, half a drachm.
Soft soap, an ounce.
Water, a pint.
Mix, and rub them together.

Medicinal use.—A very efficient enema in cases of obstinate constipation and colic.

ENEMA FŒTIDUM, *D. E.*

Fœtid Enema.

D. Take of Tincture of assafœtida, two fluid drachms.
Warm water, ℥xii.
Mix.

E. Cathartic enema, f℥xvi; Tinct. of assafœtida, fʒii.

Medicinal uses.—See Enema Assafœtidæ. p. 298.

ENEMA OPII, *L.*

Opium Glyster.

Take of Decoction of starch, four fluid ounces.
Tincture of opium, thirty minims.
Mix.

Medicinal use.—The bulk of the fluid is small, for the purpose of causing it to be retained for some time, so that it may act as an anodyne for irritable bowels. In many cases half the quantity of starch is better. As the object is that this enema should be retained, it ought to be administered almost cold, and the nurse should press the finger, covered with a soft cloth, against the anus for ten minutes, so as to retain it in the rectum. After this length of time it is not probable that it will be expelled—an accident which often occurs immediately, if this precaution is neglected.

ENEMA TABACI, *L. D. E.*

Tobacco Enema.

Take of Tobacco, a scruple.
Water, boiling, half a pint.
Macerate for an hour, and strain.

E. Tobacco, gr. xv to ℥ss; Boiling water, f℥viii. Infuse for half an hour, and strain.

Remarks. — It is the dried leaves of the tobacco which are employed.

TOBACCO, NICOTIANA TABACUM (Pentandria Monogynia; Solanaceæ).

Composition. — *Nicotina* is the active principle; it is liquid, colourless, alkaline, soluble in water, alcohol, oil of almonds, and æther. It has an acrid, burning taste, and the odour of tobacco. It is volatile at 284° F. *Solid volatile oil*, which exists only in the dried leaves; and *empyreumatic oil.*

Medicinal properties. — *Acrid; emetic; diuretic; sialogogue; sedative; laxative.*

Nicotina is so powerful that a single drop killed a dog when applied to its tongue.

When first taken by a person unaccustomed to its use, tobacco causes nausea, cold clammy sweat, great prostration, and vomiting; sometimes also purging; it depresses the heart's action without perceptibly exciting it, and produces intense muscular relaxation. When taken habitually it produces a soothing effect upon the nerves, and in the opinion of many smokers it clears the intellect. It causes an increase of the salivary secretion, and assists the action of the bowels. Many habitual smokers are affected with constipation, if they discontinue its use. It is said to cause dyspepsia; and I have known cases in which this effect has undoubtedly been produced: but it is far from being a common circumstance. It however allays hunger, perhaps by its sedative effect upon the nerves of the stomach; and I have been informed by an extensive retail tobacconist, that the consumption of tobacco by the poor is always the greatest in bad times. It often supplies the place of food in these circumstances. It appears sometimes to possess stimulant properties; for I have repeatedly noticed that men who were almost exhausted by long-continued severe walking, have been immediately refreshed, and enabled to continue their journey on taking tobacco as a quid. Its effects when taken in the form of snuff are well known. The operation of "stoving" or drying the leaf, in the preparation of common cut tobacco, is very injurious to the health of the workmen. The sedative effects of tobacco upon the heart appear to be produced through the medium of the nervous centres; for if the head is removed from an animal poisoned by this drug, and artificial respiration is kept up, the heart does not become paralysed; but if the head is allowed to remain, this effect does occur (*Brodie*). Dr. Stokes alludes to the frequency of *palpitation of the heart produced by excessive smoking.* "This often occurs in young men of the better class who have recently entered the army, and have smoked to excess, in addition to other irregularities. It is rarely seen among peasants, or in men who have passed the age of twenty-five."* In the Liverpool Eye and Ear Infirmary so many cases of *partial amaurosis* have been observed amongst men who *chew* much tobacco, that it is difficult not to connect the two as cause and effect; but I was informed by the senior surgeon to the New York Eye Hospital, that amaurosis is a rare disease amongst their patients, and is not traceable to any such cause even when it does occur; which throws considerable doubt upon the connection between them. Chewing is, however, at once forbidden to the Liverpool patients as a preliminary to other treatment, and the subject is one which deserves attention, and may perhaps receive elucidation from observations in other ophthalmic institutions.

The empyreumatic oil produces a depressing effect similar to that caused by the tobacco itself; and, more than once, death has resulted from its local application to the scalp for the cure of ringworm.

Characteristic effects.—Vomiting, and intense muscular and vascular depression. It is *distinguished* from *digitalis* by producing greater muscular, and less vascular prostration; and in its greater effect upon the secretions generally; and from *belladonna* and *hyoscyamus*, by *contracting* the *pupil*.

Uses.—In the form of enema, in *obstinate obstructions* of *the bowels*, *ileus*, *lead colic*, *strangulated hernia*, *retention of urine from spasm of the neck of the bladder;* and in *rigidity* of *the os uteri*. Sometimes tobacco smoke is thrown into the rectum by a pair of bellows in these affections. Its use is attended with great danger; and in more than one instance the subject of a strangulated hernia has died from the immediate effects of a tobacco enema. It is also highly dangerous when injected into the vagina, to remove rigidity of the os uteri. Notwithstanding these circumstances, the majority of eminent surgical writers have advised its cautious employment before resorting to the operation for strangulated hernia; but it is probable that it will now be entirely superseded by chloroform in these cases. It sometimes cuts short an attack of *spasmodic asthma*, if smoked on its approach; and it is used in the same way for the relief of *toothache*. In India the soldiers are in the habit of folding a moistened tobacco leaf round the testicle to cure *testitis*. It produces excessive nausea and depression, but usually answers the purpose in four and twenty hours. Tobacco has been applied in the form of fomentations along the spine in *tetanus*, and also in the form of enema. I have seen one case (a child thirteen years old) in which the fomentation seemed useful; at least the child recovered: but it has failed in so many others, as to deserve no more confidence than any other remedy in the treatment of this disease. The infusion, and also the empyreumatic oil, have been applied locally for the cure of ring-worm; but they are both dangerous and inefficient.

Antidotes.—None. Artificial respiration should be practised.

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* On Diseases of the Heart and Aorta, q. by Lanc. Ap. 1854, p. 394.

Green tea or vegetable astringents and stimulants are the most useful.

Dose and administration. — Tobacco is not administered internally; and the enema is its only officinal preparation. The proportion of tobacco ordered is ℈j to Oss of boiling water, being less than in the last Pharmacopœia. In administering it, its effects should be carefully observed; and in a few minutes, if necessary, another equal portion must be given, but the quantity of ʒj should never be exceeded.

ENEMA TEREBINTHINÆ, *L. D. E.*

TURPENTINE ENEMA.

Take of Oil of turpentine, a fluid ounce.
Yolk of one egg.
Barley water, nineteen fluid ounces (f℥xvi, *D.*).

Rub the oil with the yolk, and mix the barley water.

Medicinal use. — Employed in cases of intestinal worms, chiefly of *tænia*, and likewise in some spasmodic affections, as in *chorea*. In the *tympanitis* of fever, and of peritoneal inflammations, and especially of puerperal peritonitis.

ESSENTIÆ, *D.*

ESSENCES.

SENTIA ANISI.	Essence of Anise.
" Carui.	" Caraway.
" Cinnamomi.	" Cinnamon.
" Fœniculi.	" Fennel.
" Menthæ piperitæ.	" Peppermint.
" " pulegii.	" Pennyroyal.
" " viridis.	" Spearmint.
" Myristricæ Moschatæ.	" Nutmeg.
" Pimentæ.	" Allspice.
" Rosmarini.	" Rosemary.

ll prepared by dissolving one fluid ounce of the volatile oil bstance in nine fluid ounces of rectified spirits.

rties, uses, and doses. — See the SPIRITS of the respective

EXTRACTA.

EXTRACTS.

In preparing extracts, unless otherwise ordered, evaporate the water by a water-bath in a pan as quickly as possible, towards the end stirring constantly with a spatula until a proper consistence is acquired for forming pills.

(Most of them, however, may be obtained of greatly superior quality by the process of evaporation in vacuo, and the extracts of expressed juices cannot perhaps be better prepared than by spontaneous evaporation in shallow vessels exposed to a current of air, *E.*)

Remarks. — Extracts contain the active principle of vegetables in a more concentrated and convenient form, than that in which they naturally exist in the plants. They are prepared in different ways according to the nature of the vegetable substance operated upon. The active principles of some plants, as of cinchona, gentian, and logwood, are soluble in boiling water, and they are therefore boiled in this menstruum, until the whole of the medicinal ingredients are dissolved: and the strained solution, being evaporated, constitutes the extract. Some substances, as jalap, which contain resinous constituents, yield them only to proof spirit, which is therefore employed as water is in the other cases. The latter are termed *spirituous*, the former *aqueous*, extracts.

Under the class of extracts are now included what were formerly termed "*inspissated juices.*" In many plants, as belladonna and hyoscyamus, the active principles reside in their juices; and they are therefore crushed and pressed in an hydraulic press, until the whole of the juice is forced out, which is afterwards evaporated. In others, as lettuce or elaterium, the active principles reside in a juice which exudes when the plant is wounded; and it is this juice alone which is evaporated to form the extract.

In conducting the evaporation, especially of these juices, great care is necessary to avoid too high a temperature, as some of the active ingredients are dissipated by a heat below that of boiling water; and others are altered in their nature, or their activity is diminished. Many druggists now, therefore, prepare extracts "*in vacuo*;" that is, they evaporate the liquors in an apparatus from which the air has been removed by an air-pump, and from which the steam is continually withdrawn in same way. By this means the temperature at which the liquids boil is lowered many degrees, and the risk of injuring their virtues is lessened. In a perfect vacuum *all* liquids boil at 140° F. *below their natural* boiling point; hence water boils at 72° F., and ether at —44° F. But as the presence of vapour from the liquid prevents the attainment of a perfect vacuum, these extracts are not prepared at a temperature by any means so low as that first mentioned for water.

Some substances, as cinchona, are injured by the long-continued heat and exposure to the air necessary for making them into extracts; this is, therefore, a class of medicines whose properties are somewhat uncertain and variable; and they are by no means so much more powerful than the substances from which they are obtained, as might at first be supposed.

EXTRACTUM ACONITI, *L.E.*

EXTRACT OF ACONITE.

Take of Aconite leaves, fresh, a pound.

Bruise them in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence.

E. Bruise the leaves and express the juice; subject the residuum to percolation with rectified spirit, so long as the spirit passes materially coloured; unite the expressed juice and the spirituous infusion; filter; distil off the spirit, and evaporate the residuum in a vapour-bath.

Dose.—Gr. i. or gr. ii. at first. To be gradually increased until some effect is produced.

EXTRACTUM ALOËS, *L.* (AQUOSUM, *D.*).

(WATERY, *D.*) EXTRACT OF ALOES.

Synonyme. Extractum Aloës purificatum, *Ph. L.* 1836.

Take of Socotrine (hepatic, *D.*) aloes (powdered), fifteen ounces.
Water, boiling, a gallon.

Macerate for three days with a gentle heat; afterwards strain, and set by that the dregs may subside. Pour off the clear liquor, and evaporate it to a proper consistence.

EXTRACTUM ALOËS BARBADENSIS, *L.*

Extract of Barbadoes Aloes.

Prepare this in the same way as Ext. Aloës.

Medicinal properties and uses. — See Decoctum Aloës comp. This extract is supposed to be less griping than simple aloes. It is made chiefly for the purpose of separating impurities, "the necessity for which will be sufficiently obvious to any one who has ever seen a cwt. of aloes melted" (*Pereira*).

Dose. — Gr. v to gr. xv.

Officinal preparation. — Compound Extract of Colocynth.

EXTRACTUM ANTHEMIDIS, *E.*

Extract of Chamomile.

Take of Chamomile, a pound; boil it with a gallon of water down to four pints; filter the liquor, hot; evaporate in the vapour-bath to a due consistence.

Medicinal properties and uses. — See Inf. Anthemidis. The extract is principally used to give consistence to pills.

Dose. — Gr. x to gr. xx.

EXTRACTUM BELLADONNÆ.

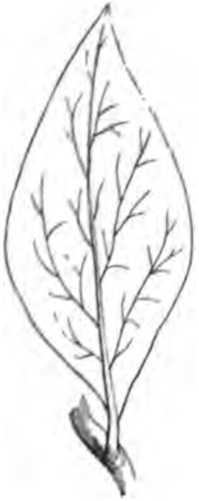
Extract of Deadly Nightshade.

Prepare this in the same way as Extract. Aconiti.

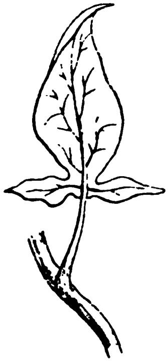
ATROPA BELLADONNA (Pentandria Monogynia; Solanaceæ).

Description. — Belladonna generally grows in shady places, and has a dark lurid aspect. The flowers are dark purple, bell-shaped, and mostly pendulous. The whole plant possesses poisonous properties, and the root is even more powerful than the leaves. The berries are brownish-black and shining, and are often the sources of accidental poisoning, being eaten by children from their tempting appearance and sweet taste. The leaves are dark green, *smooth*, shining, about three or four inches in length, with a *very short* leafstalk, ovate, acute at the apex, and with a smooth, undivided margin.

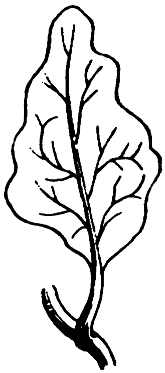
The plant which grows spontaneously in hedges and uncultivated places is to be preferred to that which is cultivated in gardens.



Atropa belladonna.



Solanum dulcamara.



S. nigrum.

They should be collected in June or July, "when the plant begins to flower," *D.*

Leaves for which belladonna may be mistaken. — The characters by which the *dried* leaves may be distinguished from hyoscyamus and digitalis, are given in the article Infusum Digitalis. The *fresh* leaves are sometimes mistaken for those of Solanum dulcamara and Solanum nigrum, which is an important error, as the solanum possesses very feeble powers compared with belladonna.

The leaves of S. dulcamara are not nearly so large or dark as those of belladonna, and the petiole is often half the length of the leaf. The upper leaves have two small pinnæ near their base. Those of S. nigrum are also small, are not acute at the apex, and are coarsely serrated or sinuated.

Composition. — *Atropia*, *belladonnin*, and *atropic acid.* *Atropia* forms delicate silky crystals, volatile at a heat above 212° F. They are soluble in ether, alcohol and acids; scarcely soluble in water. It is a most energetic poison; an inappreciable quantity caused dilatation of the pupil; and gr. $\frac{1}{16}$ in a man occasioned dryness of the mouth, constriction of the throat, difficulty of swallowing, stupor, dilated pupil, and headache. *Belladonnin* is a volatile alkali which causes heat and constriction of the throat. *Atropic acid* is a volatile crystallisable acid.

A solution of atropia is often used for dilating the pupil, instead of extract of belladonna. It is more easily applied, acts more quickly, causes less irritation, and is more certain in its effects. Two grains of atropia may be dissolved in an ounce of distilled water, by the addition of six or eight minims of hydrochloric acid. A single drop placed in the eye by means of a camel's hair pencil is sufficient.

Atropia is not manufactured in this country, but is imported from Germany.

Medicinal properties.—Acrid narcotic; resolvent. When applied externally, or taken internally, belladonna *allays various local neuralgic pains*; and, as an external application, it is superior to any other anodyne, except aconite, in these cases. When applied near the eye, it causes *dilatation* of the pupil, which often continues for some hours. It produces the same effect when taken internally; and, thus administered, it sometimes occasions temporary loss of vision. It is said not to affect the sight when locally applied; but I saw a case lately in which the application of the extract to the cheek for the relief of tic douloureux produced considerable effect. All objects were indistinct, and small ones could not be seen. "Every thing appeared waving like a field of corn in the wind." This effect continued about twelve hours. Belladonna is thought to relieve spasmodic contractions. When taken internally, it causes dryness of the throat; difficulty of swallowing; *cheerful, laughing delirium*; and sometimes vomiting and purging, and subsequent salivation. Its continued use produces an eruption resembling that of scarlatina. It is said by German writers of credit to act as a *prophylactic against scarlatina*; and in some trials which he made in this country, Mr. Maclure found that those persons who took it escaped the disease, whilst it attacked others who did not take it, though all were equally exposed to the infection.* It fails, however, in so many instances, as to render this property doubtful. It is said by M. Delhaye to be very valuable in checking the *diarrhœa* of *phthysis*.† Dr. Osborne, of Dublin, states that it relieves the *migratory flying pains* of *rheumatism*, though it has no effect upon the fixed pains.‡ Dr. Hall speaks very favourably of its effects in *orchitis*, when painted upon the inflamed testicle.§

Physiology of the dilatation of the pupil.—It is very difficult, if not at present impossible, to explain this effect, which is, however, attempted by Mr. Walker, "The *circular* fibres of the iris, and the palpebræ and eyebrows, are supplied with nerves from the fifth pair; whilst the *radiated* fibres are supplied from the third pair. Belladonna acts upon the nerves of the forehead, and through them upon those of the circular fibres, when it is locally applied, but does not act upon the third pair."‖ This hypothesis is ingenious, but it does not account for the effect when belladonna is taken internally, and there is no distinct anatomical evidence that the two sets of fibres are thus supplied by different nerves.

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* Med. Gaz. vol. xxi. p. 366.

† Lancet, 1841-42, vol. i. p. 531.

‡ Med. Gaz. vol. xxv. p. 829.

§ Lancet, 1837-38, vol. ii. p. 81.

‖ Ibid. 1840-41, vol. i. p. 45.

Characteristic effects of belladonna.—Remarkable *dilatation* of the pupil; *dryness* and *constriction* of the *throat*; difficulty of swallowing; *gay delirium*, and the absence of convulsions.

Antidotes.—At first an emetic; then cold to the head, and ammonia or other stimulants internally; afterwards vegetable acids or astringents.

Uses.—Chiefly in *affections of the eye.* In *iritis*, to break up the adhesions and prevent the contractions of the pupil by effused lymph. In *prolapsus* of the *iris*, through a wound in the cornea, when it is the *fibres near the pupil* which have prolapsed. Previous to operations for *cataract*, especially that by extraction. In *orchitis.* In *tic douloureux* and *local neuralgias* generally. In *palpitation* of the *heart*, whether dependent upon organic or functional causes. (See Empl. Belladon. p. 286.) In *dysmenorrhœa*, applied to the sacrum or above the pubes. In *rigidity* of the *os uteri*, or painful *contraction* of the *sphincter ani.* In *chorea.* In all these cases, it is to be applied locally; and the plaster or extract, made thin with simple cold water, is the best form. In the *diarrhœa* of *phthysis;* and in *dysmenorrhœa* unaccompanied by discharge of shreds of mucus, when the pain is referred chiefly to the lower part of the abdomen, it may be given internally, and it should be combined with one grain of sulphate of zinc or ipecacuanha for each dose. In *erratic rheumatic* pains. In some *chronic tumours*, as a resolvent. As a *prophylactic* against *scarlatina*, it may be tried cautiously, and cannot do much harm, if it do no good. The evidence respecting its utility as a prophylactic is conflicting, but upon the whole it is in its favour. The dose should be small, gr. ¼ to gr. ½. In *fever* accompanied with *contracted pupil*, it has been given by Dr. Graves, on the ground that it may cause an opposite cerebral state to that which occasions the contracted pupil. In *hooping cough*, it is generally combined with carbonate of soda. In this disease it should not be given during the early stage whilst inflammatory symptoms are present. In these cases, it is given internally. It is also used as an enema in *ileus* and *strangulated hernia*, to obviate the necessity for employing tobacco enemas. The powdered leaves sprinkled upon *painful cancerous* or *unhealthy sores*, allay the pain in a remarkable degree.

Dose.—The extract is the only form which is used internally. It varies much in its strength, and should therefore be given cautiously at first. The dose may be from gr. ⅒, in hooping cough, gradually increased to gr. ½ or gr. ¾, according to the age and strength of the child. In other cases, in adults, the dose may be from gr. i to gr. ij or gr. iij, twice or thrice daily. If it is to be taken for a length of time, as for the removal of tumours, the dose should be small. In most other cases, the good effects are not generally perceived, until some dryness of the throat and other constitutional symptoms are induced. I have seen effects resembling mania follow a single dose of three grains of the extract.

EXTRACTUM CANNABIS INDICÆ PURIFICATUM, *D.*

PURIFIED EXTRACT OF INDIAN HEMP.

Synonyme. Gunjah. Churrus.

Take of Extract of Indian hemp, of commerce, one ounce.
Rectified spirit, four fluid ounces.

Dissolve the extract in the spirit, and when the drugs have subsided decant the clear liquid, and evaporate by means of a water-bath to the consistence of a soft extract.

CANNABIS INDICA (Diœcia Pentandria; Urticaceæ).

Description.—This is an herbaceous plant, three or four feet high, which does not differ materially from the common European hemp, except that its leaves are covered with a kind of resinoid varnish. *Gunjah* is the whole herb dried after flowering, forming a bundle three or four feet long. *Churrus* is the resinous covering of the leaves mixed with fragments of leaves and broken pieces of the plant. It is usually made into balls, about the size of a hen's egg. An alcoholic extract is prepared from this churrus in India, and is now sent to this country.

Composition. — Churrus consists of a peculiar *resin*, in which its virtues chiefly reside, combined with *chlorophylle ;* a concrete oil, and woody and inert substances. *Rectified spirit* is its proper menstruum, neither proof spirit nor water dissolving the resinous active principle.

Medicinal properties and uses. —When swallowed, Indian hemp produces in the East, sometimes joyful, sometimes quarrelsome, intoxication, and sometimes mere lazy cheerfulness, with the alleviation of any pre-existing pain. It is not generally followed by the depression which succeeds spirits or opium; but its habitual employment ruins the health and mental faculties. In one case mentioned by Mr. Barrow a lady took ♏xv of the tincture three times in succession, at intervals of two hours. Soon after the last dose she became drowsy, and in a few hours unconscious; eyes wide open and staring; pupils dilated and fixed; strong convulsions, and muscular twitchings, which latter continued for two days. The complete insensibility lasted ¼ of an hour, but partial unconsciousness remained all the night.* It was first recommended in this country by Dr. O'Shaughnessy, who reported highly of its success as an anodyne, and especially in the treatment of tetanus. It has been tried in many instances of this disease in this country, but hitherto with so little success as to make it probable that the British constitution is less easily affected by it, or else that the climate produces an injurious influence upon its effects. It may be said thus far to have proved a failure in the treatment of tetanus. Dr.

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* Med. Times, Oct. 7. 1847.

Christison has used it frequently as an anodyne, and finds it of sufficient value to say, that it is a "remedy which deserves a more extensive inquiry than any hitherto instituted."

In *menorrhagia*, "when the discharge, though excessive, is fluid, and but little mixed with clots, and the uterus is not enlarged," and in cases in which the menstrual discharge, whether too much or not, returns too frequently, Dr. Churchill speaks highly in favour of the Indian hemp. Its employment in these cases was first suggested by Dr. Maguire, who accidentally learnt its efficacy in a case of profuse menorrhagia; the disease for which he prescribed it being some form of neuralgia. In the above class of cases, ♏v of the tincture three times a day has frequently stopped the discharge in twenty-four or forty-eight hours; and in too frequent menstruation it has retarded the appearance of the discharge to its natural period. When the uterus is congested, and the discharge largely mixed with coagula, its success is not great. In some cases of *threatened abortion*, with slight hæmorrhage and few and feeble pains, Dr. Churchill has also found it useful, *if employed very early*, but of no use if delayed. The preparation which he employed was the tincture, and he began with ♏v three times a day, sometimes increasing the dose to ♏x, but seldom more.*

Dose.—Of the *extract*, gr. ij to gr. v, to allay pain or produce sleep. In the treatment of tetanus, the dose should be repeated every hour or two until an effect is produced. The tincture is a good form for administration, dose ♏xx to ♏xl in tetanus; ♏v to ♏xxx in other cases, according to the effect produced.

EXTRACTUM CINCHONÆ, *L. E.*

EXTRACT OF YELLOW BARK.

Synonyme. Extractum Cinchonæ Cordifoliæ, *Ph. L.* 1836.

Take of Yellow cinchona, coarsely powdered, three pounds.
Distilled water, six pints.

Add four pints of water to the cinchona, and stir diligently with a spatula, until it is thoroughly wetted. Macerate for twenty-four hours, and strain through linen. Macerate what remains in the water for twenty-four hours, and strain. Then evaporate the liquors, mixed together, to a proper consistence.

E. Take of any variety of Cinchona, in fine powder, ʒiv; Proof spirit, f ʒxxiv. Percolate the cinchona with the spirit; distil off the greater part of the spirit, and evaporate what remains in an open vessel over the vapour-bath to a proper consistence.

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* Rankin's Abst., vol. x. p. 319.

EXTRACTUM CINCHONÆ PALLIDÆ, *L. E.*

Synonyme. Ext. Cinch. Lancif. *Ph. L.* 1836.

EXTRACTUM CINCHONÆ RUBRÆ, *L. E.*

Synonyme. Ext. Cinch. Oblong. *Ph. L.* 1836.

Prepare these in the same way as Ext. Cinchonæ.

Remarks. — The present form is a great improvement upon the directions in the last Pharmacopœia, inasmuch as the long continued boiling is omitted, which converted the tannic acid into insoluble red cinchonin; but the extract is a bad form at any time, and, since the discovery of the salts of quinine, has been very little used. The water dissolves the super-kinates of quina and cinchonia, and the tannic acid and other soluble ingredients.

Medicinal properties. — Tonic; stomachic.

Dose. — Gr. x to ʒss.

EXTRACTUM COLCHICI, *L.*

EXTRACT OF MEADOW SAFFRON.

Take of Fresh colchicum cormus, a pound.

Remove the outer coats, and operate in the manner directed for Extract of Aconite.

Medicinal properties and uses. — Chiefly in the early stages of acute rheumatism, in doses of gr. j to gr. ij, every four hours, until it purges severely. (See ACET. COLCH. p. 69.)

EXTRACTUM COLCHICI ACETICUM, *L. D. E.*

ACETIC EXTRACT OF MEADOW SAFFRON.

Take of Meadow saffron cormus, fresh, a pound.
Acetic acid, three fluid ounces.

Bruise the cormus, stripped of its rind, and sprinkled gradually with the acetic acid; then press out the juice, and evaporate it unstrained (in a porcelain vessel, not glazed with lead, *E*), to a proper consistence.

E. Bulb of colchicum, ℔i; Pyroligneous acid, f℥iii. (It is not specified whether the colchicum is to be fresh or dried.)

D. Colchicum root, dried, ℥iv; Dilute acetic acid, f℥viii. Digest the root in the acid for fourteen days, then filter, and evaporate by means of a water-bath to the consistence of a soft extract.

Remarks. — The use of the acetic acid is to render the salt of colchicia, which the meadow saffron contains, more soluble.

Medicinal uses. — It has been much employed in cases of acute rheumatism and gout, in doses of gr. j to gr. ij, twice or thrice a day.

Dr. Paris (Appendix to Pharmacologia) states, that he has found this extract useful in promoting healthy discharges of bile. He has occasionally combined it with blue pill, calomel, or tartar emetic.

EXTRACTUM COLOCYNTHIDIS, *L. E.*

EXTRACT OF COLOCYNTH.

Take of Colocynth, sliced, the seeds being removed, three pounds.
Distilled water, half a gallon.

Macerate the colocynth for thirty-six hours, frequently pressing it with the hand. Express the liquid strongly, and strain. Lastly, evaporate to a proper consistence.

E. Colocynth, ℔i; Water cong. ii. Boil gently for six hours, replacing the evaporated water occasionally. Strain the liquor whilst hot, and evaporate it in a water-bath to a due consistence.

CITRULLUS (CUCUMIS) COLOCYNTHIS (Monœcia Syngenesia; Cucurbitaceæ).

Description. — Colocynth or bitter apples are about twice the size of common apples. They are smooth and yellow externally, but the outer rind is frequently removed before they are exposed for sale, and they are then white. They contain a large quantity of very spongy colourless pulp, within which the seeds are loosely imbedded, and may be made to rattle, by shaking the pepos.

Composition. — *Colocynthin* (purgative bitter principle), and *extractive.*

Medicinal properties. — *Purgative.*

Characteristic effects.—Given alone, colocynth is a *drastic hydragogue cathartic,* and frequently stimulates the kidneys also, producing diuresis; but it is seldom or never prescribed alone. In combination with other purgatives it is one of the safest and most efficient vegetable cathartics in the Materia Medica. It acts especially upon the large intestines, and stimulates the pelvic viscera.

Its habitual use is not liable to be followed by injurious consequences.

Uses. — As a *common aperient* the compound extract is more frequently used than any other purgative. In *habitual constipation* it is one of the best which we possess. In *obstinate constipation* or *obstruction*, if not dependent upon some mechanical impediment, it seldom fails to succeed. In *diseases of the brain* it is used as a revulsive, and it is frequently employed with good effect in *dropsies*.

Dose and administration. — The simple extract is not a good form, as it is very apt to become mouldy or tough by keeping. The dose is gr. v to ℈j.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM.

COMPOUND EXTRACT OF COLOCYNTH.

Synonyme. Extractum Catharticum.

Take of Extract of colocynth, one drachm.
Extract of aloes, powdered, six drachms.
Scammony, powdered, two drachms.
Cardamom (husked), powdered, half a drachm.
Soft soap, one drachm and a half.

Mix the powders together; then, having added the other things, beat them all together, that a mass may be made.

Remarks. — Although this preparation is no longer retained in any of the Pharmacopœias under the above name, being called "pilula colocynthidis," or "pil. coloc. comp.," it is so universally known by its own title, that I have preferred retaining it in its old place rather than omitting it, and inserting it only under its new title.

Remarks upon the Compound Extract of Colocynth.—It is of the greatest importance that the purest scammony should be used, and that *purified* aloes should be employed, as a large proportion of common aloes consists of impurities which are removed by the straining. This extract is liable to become mouldy, and when long kept, frequently becomes so hard as to be dispensed with difficulty. The addition of a few drops of rectified spirit almost instantly softens it, and enables it to be worked into pills without difficulty. It is very frequently exceedingly adulterated, gamboge being substituted for the colocynth. It ought not to effervesce when dropped into hydrochloric acid.

Properties and uses.—See EXTRACTUM COLOCYNTH. The compound extract is very frequently combined with calomel in prescriptions, or with extract of hyoscyamus, which prevents its griping effects, and does not diminish its purgative powers.

Doses. — Gr. v to gr. xv, with gr. ij or gr. iij of extract of hyoscyamus.

Officinal preparations.—Enema Colocynthidis.

CONVOLVULUS SCAMMONIA (Pentandria Monogynia; Convolvulaceæ).

Description.—Scammony is obtained from the Convolvulus scammonia, by cutting transverse slices obliquely from the top of the root, after the plant has been cut down. A milky juice exudes, which is collected in shells placed round the root. The juice from the different roots, each of which yields only a few drachms, is often put into an old boot for want of a more convenient vessel.

Adulterations.—Whilst it is still soft, various substances are mixed with it, as flour, sand, and especially chalk. This is done, not with a fraudulent intention, but in order to satisfy the English desire to obtain the drug at a lower cost than that at which it can possibly be afforded.* The best scammony comes from Aleppo.

Scammony is sometimes adulterated with resin of guiacum, which may be detected by pouring some of the suspected sample dissolved in alcohol upon white blotting-paper, and exposing it to the fumes of nitrous acid, obtained by pouring nitric acid upon small pieces of copper in a test tube. If guiacum is present a blue colour is produced.

Characters.—Porous; fragile; it is shining when a portion is broken off; hydrochloric acid being dropped on, it emits no bubbles; nor, when first powdered and digested in water at a temperature of 170°, is the water tinged of a blue colour on the addition of iodide of potassium and nitric acid at the same time. 78 grains per cent. ought to be dissolved in ether.

Varieties. — Scammony is found in three forms, which differ greatly in purity.

Virgin scammony. This is pure or very nearly so. It has no regular form, and is dark green, almost black, and contains many small air cells; it is friable, and fragments can easily be chipped off with the finger nail; it is not much heavier than water, sp. gr. 1·2; and forms a kind of milky fluid when rubbed with the moistened finger. It does not contain any grains or patches of white matter. Sometimes its exterior is covered with a whitish powder, which effervesces on the addition of hydrochloric acid; but this is in very small quantity.

Seconds resembles the last in general appearance, but is somewhat heavier, less brittle, and is marked by streaks or patches of white matter (chalk) which effervesces on the addition of hydrochloric acid.

Thirds, or cake, is very impure indeed. It is in circular cakes about five inches in diameter; very heavy, hard, and cannot be broken by the nail; much darker coloured; and contains large quantities of chalk.

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* Pharm. Journ. 1844.

Substances for which scammony may be mistaken.—*Aloes.* It is distinguished by its dark green colour, its porous texture, and the absence of the glossiness and odour of aloes.

Composition.—*Resin* (purgative principle), containing the largest proportion of oxygen of any resin that has yet been analysed; and *gum.*

Medicinal properties.—*Drastic cathartic.*

Characteristic effects.—The operation of scammony is chiefly irritant, and affects the whole of the bowels. On this account it acts most efficiently when there is a deficiency of intestinal mucus, indicated by hard, dry, fæcal evacuations; in which case, however, it is very liable to gripe, an effect that may be diminished by very fine trituration. When there is copious mucous secretion it has less efficacy, and is therefore not so well adapted as a purgative to remove intestinal worms as gamboge or colocynth. It never becomes poisonous in an overdose.* It is not so powerful a hydragogue as gamboge or jalap, but is more efficient than the latter as a general purgative. It is said by some Continental writers to be very uncertain in its action, but the experience of British practitioners is opposed to this statement.

Uses.—Scammony is seldom prescribed alone, but is generally ordered in combination with other purgatives. It is an excellent medicine for children, as it may be given to them in milk without imparting a disagreeable taste to it. It is used in cases commonly requiring cathartics.

Dose and administration.—The dose of common scammony is from gr. x to gr. xx; but of virgin scammony, from gr. v to gr. xv. It is usually prescribed in the form of pill; but the best form is that of emulsion, consisting of gr. vii of virgin scammony, gradually triturated with f℥iij of milk. This is the dose for children.

EXTRACTUM CONII, *L. D. E.*

EXTRACT OF HEMLOCK.

Synonyme. Succus Cicutæ Spissatus. Extractum Cicutæ.

Prepare this in the same way as Extract of Aconite.

E. Beat the leaves in a stone mortar; express the juice, and filter it. Let this juice be evaporated to the consistence of a very firm extract, either in a vacuum with the aid of heat, or spontaneously, in shallow vessels exposed to a strong current of air.

This extract is of good quality only when a very strong odour of conia is disengaged, by degrees, on its being carefully triturated with aqua potassæ.

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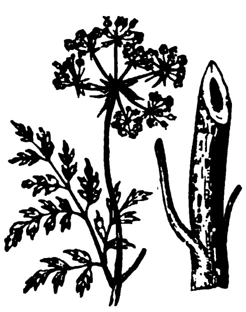
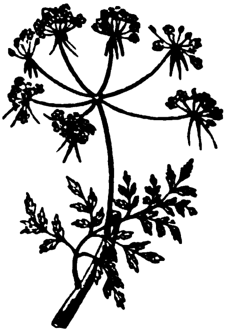
* Christison, Dispens.

CONIUM MACULATUM (Pentandria Digynia; Umbelliferæ).

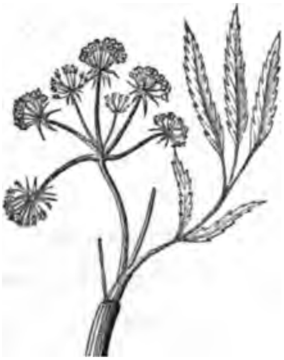
Description. — Conium is one of the few umbelliferous plants which possess poisonous or deleterious properties. It grows about two or three feet high, and is characterised by its *smooth round stem extensively marked with purple spots*, which are sometimes so numerous as to coalesce and give the whole stem a purple or even blackish appearance. It is sometimes mistaken for other umbelliferous plants, of which the most important are, *Æthusa cynapium*, or fool's parsley; *Cicuta virosa*, or water hemlock; *Anthriscus sylvestris*, or common cow's parsley; *Anthriscus vulgaris*, or common beaked parsley; *Œnanthe crocata*, or hemlock water-dropwort; and Chæ-



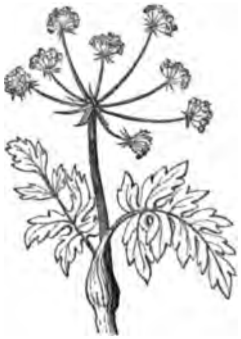
Conium maculatum.



Æthusa cynapium.



Cicuta virosa.



Œnanthe crocata.

rophyllum temulentum. It must be through great ignorance or carelessness that any of these plants except the Chærophyllum temulentum can be mistaken for the Conium maculatum; but as the mistakes have occurred, not unfrequently, the distinguishing characters of each should be known.

Characters.— *Conium maculatum. Stem* smooth, spotted, *not swollen* below the leaves. *Leaves* tripinnate; dark green, shining sheathing; evolving a peculiar and disagreeable odour when rubbed. *General involucre*, three to seven leaved. *Partial involucre*, generally three leaved. *Fruit*, with undulated, crenated, primary ridges. *No vittæ.* The whole plant, when bruised, has a peculiar odour, resembling that of mice, or cat's urine.

Æthusa cynapium is smaller, not being above twelve or eighteen inches high. It is effectually distinguished by the *three depending* leaflets in the partial involucres. Its *leaves* resemble those of conium.

Cicuta virosa. Stem furrowed, *not spotted; leaves* ternate, not tripinnate. *General involucrum* either *absent*, or consisting of only one or two leaves.

Œnanthe crocata. Stem furrowed, not spotted, *swollen* below each joint. *Leaves* wedge-shaped, many cleft.

(For some cases of poisoning by this plant, see append. Œnanthe crocata.)

Chærophyllum (anthriscus) *sylvestre. Stem furrowed*, and hairy; *not spotted*, though frequently purplish in colour, but is *swollen* below each joint. *General involucre*, none.

Chærophyllum temulentum. This is an exceedingly common plant, growing under every hedge, and by the highway side, and is very likely to be mistaken for conium, as the stem is marked by numerous purple spots. It is however easily distinguished by the following characters:

Conium spotted.
„ smooth.
„ not swelled below the joints.
Chærophyllum spotted.
„ rough and hairy.
„ swollen below the joints.

Composition.— *Conia; green resin; extractive. Conia* is the active principle of the plant, and possesses the remarkable property of being liquid at ordinary temperatures, and volatile at about 120° F.[*] According to Christison it is not so volatile. Its vapour has a peculiar characteristic odour, and forms dense white fumes when a rod dipped in hydrochloric acid is held over it. It exists naturally combined with coniic acid, but the characteristic effects may be obtained by applying slight heat after the addition of potash to the bruised plant. The *seeds* contain a very much larger quantity of conia than the leaves, but both the seeds and leaves gradually lose this principle on being dried.

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[*] Battley, Lancet, 1837-38, vol. ii. p. 266.

Medicinal properties.— *Narcotic; resolvent.*

Characteristic effects.— *Conia* causes rapid paralysis of the *muscular* system. The voluntary muscles are first paralysed, then the respiratory; next the diaphragm; and death ensues from asphyxia, caused by the cessation of respiration. The heart does not appear to be much affected. It does not produce insensibility, but the muscular paralysis prevents the expression of pain in animals under its influence. It causes coma, and sometimes raving delirium, and is a most active poison. One to five drops kill small animals in from two to ten minutes. It causes *dilatation* of the pupils.

The general properties of the fresh plant agree with the above. It is thought to act especially upon the uterus, and is therefore frequently employed in cancer uteri to allay the pain, and also in dysmenorrhœa. It sometimes causes diarrhœa; and occasionally, though rarely, convulsions. Under its use tumours, supposed to be cancerous, frequently disappear.

Antidotes.—None. As the poison occasions cerebral congestion, bloodletting and artificial respiration should be adopted.

Uses.—In *cancerous and various chronic or scrofulous tumours; in dysmenorrhœa; and in chronic cough* dependent upon too great sensibility of the bronchial mucous membrane; in *profuse secretion of milk.* A full dose of the extract taken soon after a meal, sometimes relieves gastrodynia, even when it has occurred for many weeks together, after taking food. From its remarkable paralysing effects upon the muscular system, it has been proposed for the treatment of *tetanus*, and of poisoning with *strychnia;* but it has not succeeded in either of these diseases, in the few trials which have hitherto been made. In *chorea*, *hooping cough*, and *asthma*, it has been proposed on the same grounds. The powdered leaves applied locally, relieve the pain of many foul or cancerous sores. Boyle's summary of cases of cancer treated by doses of conium gradually increased until some poisonous symptoms were manifested is—46 cured, 28 benefited, 267 unbenefited; and Walshe, in quoting this result, adds that his own experience is, that the only benefit obtained is the alleviation of pain and irritability, especially in cancer of the stomach.* Still, if we can obtain relief from suffering, it is a very important matter in this most intractable class of cases. The inhalation of conium in phthysis is highly extolled by Sir C. Scudamore. (See Tinctura Conii.)

Remarks upon the extract.—This preparation is often nearly inert, owing to the volatilisation of the conia by the heat employed. Battley advises to distil off the volatile constituents, and to collect them separately; and after evaporating the remainder to a suitable consistence, to mix the volatile principle, and form an extract.†

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* Walshe, on the Nature and Treatment of Cancer, 1846, p. 195.

† Lancet, 1837-38, vol. ii. p. 266.

Bentley recommends that the juice should be simply expressed and mixed with alcohol.[*] It has been elsewhere proposed to crush the leaves, and preserve them by mixing them with treacle. It is stated that in this way a very efficient preparation is obtained, which keeps good for a great length of time. Christison thinks that an alcoholic extract prepared by percolation from the fresh leaves, and subsequent evaporation of the tincture thus obtained, is the best form. "These preparations," he says, "will keep good for a much longer time than is usually imagined.[†] In whatever way the extract is made, if heat is employed for the evaporation of the fluid, the process ought to be carried on under a vacuum."

Characteristics of good Extractum Conii.—It is generally stated that this extract ought to have a fine green colour and a peculiar odour. It is, however, well established that it may possess a beautiful colour, and yet be inert. The only real test of its value is the quantity of conia which is evolved when the extract is triturated with liquor potassæ. This is to be judged of by the strength of the odour, and the amount of fumes produced on holding a rod dipped in hydrochloric acid over it. Sometimes the extract contains a large quantity of conia, though its colour is very poor.

Dose.—Gr. ij to gr. vi, or even gr. x, *carefully watched.*

Officinal preparations.—Pil. Conii co.; Ung. Conii.

Conii fructus.—Fruit or seeds of hemlock. (See Fruct. Aromat.) It agrees in properties with the leaves, but is stronger and less liable to change.

EXTRACTUM COTYLEDONIS. (Not Off.)

Extract or Inspissated Juice of Cotyledon Umbilicus.

This is prepared as a private manufacture by sundry druggists who have not published their formulæ. The plant, which is very loose and succulent, is to be bruised and the juice expressed, and evaporated in a free current of air, or in a vacuum to the consistence of a very soft extract. This may be mixed with an equal bulk of spirit to make it keep.

COTYLEDON UMBILICUS, Navel-Wort (Decandria Pentagynia; Crassulaceæ).

This plant, which is very abundant in many parts of the west and south of England, though rare in other places, has long had a popular reputation for the relief of fits, and has lately been brought before the notice of the profession by the encomiums bestowed upon it by Mr. Salter, of Poole, and one or two others. The *medical* testimony in its favour up to the present time is still scanty, and on trying to obtain additional information to that which has been published, I have received references to clergymen and private persons, but not to medical men.

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[*] Med. Gaz. vol. xxvi. p. 346.

[†] Dispensatory, p. 361.

It is for the cure of epilepsy that it has been brought forward, and the cases which have been almost exclusively benefited, so far as our information at present extends, are those which occur in young persons about the age of puberty, and from that to three or four-and-twenty, — cases which have been traced to organic diseases as their source, but partaking probably in some degree of a functional or hysterical character. Of such there are now several favourable reports; but, on the other hand, Dr. Grieve of Dumfries has given it "a fair trial in six cases of epilepsy, taking care that the medicine was genuine, and prepared by the best chemists in London," and he "regrets to add, without its having exercised any beneficial effect" upon any of his patients.*

Upon the whole, the evidence which I have been able to collect is not strongly in favour of this remedy; but when we bear in mind the generally intractable nature of epilepsy, we shall not be surprised at this result; and the remedy is one which deserves a further trial.

Dose.—Of the fresh juice of the bruised herb f℥j; of the concentrated fluid extract from fʒss to f℥j, two or three times a day.

EXTRACTUM DIGITALIS, *E.*

Extract of Foxglove.

This may be prepared from the fresh plant by any of the methods indicated for Extract of Conium.

Medicinal uses. — See Infus. Digitalis.

Dose. — Gr. ss to gr. j.

EXTRACTUM ELATERII, *L. D. E.*

Extract of Elaterium.

Synonyme. Elaterium, *E.*

Take of Wild cucumbers (not quite ripe), a pound.

Slice the cucumbers longitudinally, and strain the juice, very gently expressed, through a very fine hair sieve; then set it by for some hours, until the thicker part has subsided. The thinner supernatant part being rejected, dry the thicker part with a gentle heat.

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* Lancet, Sept. 1852, p. 239.

ECBALIUM OFFICINARUM, MOMORDICA ELATERIUM (Monœcia Syngenesia; Cucurbitaceæ).

Remarks. — The wild or squirting cucumber is an indigenous plant, growing upon dunghills. The process by which it expels its stalks and the contents of its interior (from which it takes its name) is curious, and is an instance of the operation of *endosmosis.* When the fruit is sliced transversely, it is seen to be divided into a central portion, which contains the seeds surrounded by a thick green mucous, and separated by a layer of vegetable cellular membrane from the outer or external portion of the fruit, which contains a thin limpid fluid. This thin fluid passes by endosmosis through the membrane, as the fruit ripens, into the inner portion, which at length becomes so distended that it violently forces out the stalk, and the elasticity of the fruit causing it to contract, it expels the seeds and surrounding mucus with violence.

Process for obtaining elaterium.— The fruit (pepos) are gathered *before being quite* ripe, and are sliced longitudinally. The juice, which escapes spontaneously when the fruit is perfectly ripe, requires a slight degree of pressure to make it run out when it is not fully ripe. It is, therefore, subjected to slight pressure, and the juice as it flows out is passed through a hair sieve into a suitable vessel. It is at first clear, but in the course of a short time becomes opaque, and in about two hours deposits a small quantity of light green sediment, which, when dried upon paper or muslin, constitutes elaterium, or extract of elaterium.

Description. — *Fine good elaterium* is in thin, *slightly* curled, or nearly flat pieces, which have a pale green colour, are friable, and float upon water. They do not effervesce on the addition of hydrochloric acid; and when they are digested in this acid, and the solution is nearly neutralised by ammonia, the addition of oxalate of ammonia does not cause any precipitate. When touched with tincture of iodine, they do not become blue, though if boiled in water, the solution becomes slightly blue on the addition of iodine. Boiling alcohol dissolves rather more than half the elaterium, and forms a fine green tincture, which, when concentrated and added to hot liquor potassæ, deposits from a seventh to a fourth of its weight of fine silky colourless crystals, which are *elaterin.*

Inferior elaterium is in thicker pieces, which have a darker colour, are more curled, less brittle, do not float on water, effervesce on the addition of hydrochloric acid, and become blue on the addition of tincture of iodine. The solution in hydrochloric acid becomes turbid, and forms a precipitate if it is first neutralised with ammonia, and then has solution of oxalate of ammonia added to it.

Adulterations and tests. — *Chalk* and *starch* are the principal adulterations. The characters above given detect the presence or absence of these. If chalk is present, it will effervesce on the addition of hydrochloric acid, and the neutralised solution will throw down a precipitate of oxalate of lime on the addition of oxalate of ammonia. If starch is present, it will be shown by the blue colour on the addition of tincture of iodine. A *small* quantity of starch is, however, always present, and is not an adulteration.

Composition. — *Elaterin; bitter principle; green resin; salt of potash;* and *woody fibre.*

Elaterin. — This is the active principle of elaterium, and constitutes from 15 to 44 per cent. of its weight. It is obtained by boiling elaterium in alcohol, which dissolves the elaterin, the green resin, and the bitter principle. This solution is evaporated and then added to hot solution of potash, which dissolves the resin and the bitter matter, but causes the precipitation of the elaterin in the form of fine, silky, colourless crystals.

Elaterin is insoluble in water or cold solution of potash; it is slightly soluble in ether, and is readily dissolved by rectified spirit.

Medicinal properties. — *Violent hydragogue cathartic.* It frequently causes nausea, and excites griping, showing that its action is not confined to the mucous membrane of the bowels, but extends to the muscular coat also. Its operation generally induces considerable thirst, and furred tongue. Its effects are very variable, which is easily accounted for on comparing the different proportions of elaterin obtained from different specimens. It is remarkable that when given with mercury, it does not prevent that drug from salivating as quickly as if it were given alone.

Uses. — *Dropsy* of all kinds. It sometimes occasions the evacuation of several pints of fluid in the day. It is very valuable in dropsy dependent upon disease of the kidney, as it removes the fluid without stimulating the diseased organ. It should be avoided in very debilitated persons, or in cases where there is inflammation of the bowels. In *cerebral affections*, as *apoplexy* and *mania*, it is used as a revulsive. It is strongly advised in *acute hydrocephalus* in children. It may be employed as an active purgative, when combined with other medicines of this class, in *obstinate constipation.*

Dose and administration. — Of good elaterium, the dose is from gr. ⅛ to gr. ¼, every three or four hours, until copious purging is obtained; but its quality varies so much that sometimes a grain is not too large a dose. In consequence of this uncertainty, elaterin is frequently employed instead. The dose is from gr. 1/16 to gr. ⅙ mixed with eight or ten grains of bitartrate of potash, or dissolved in spirit, as recommended by Dr. Golding Bird.* Its griping effects may be prevented by combining it with a grain of capsicum, or with ginger. It may be given every other day for eight or ten days, and it is advantageously alternated with tonics, as gentian. If it is continued longer than this, it is liable to cause inflammation of the bowels.

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* Med. Gaz. vol. xxv. p. 909.

EXTRACTUM GENTIANÆ, *L.D.E.*

EXTRACT OF GENTIAN.

Take of Gentian, sliced, three pounds.
Distilled water, six pints.

Macerate for twelve hours in four pints of the water; pour off the liquor, and strain. Add two pints of water to the remainder, macerate for six hours, express the liquid gently, and strain. Lastly, evaporate the liquids, mixed together, to a proper consistence.

Remarks. — Extract of gentian has a dark colour, but little smell, and a strong though not disagreeable, bitter taste. It is tonic and stomachic. It is seldom employed alone, but chiefly as a vehicle for mineral tonics, as the preparations of iron or zinc. Good gentian is stated by Mr. Brande to yield half its weight of extract.

Dose. — Gr. v to gr. xx, twice or three times a day.

EXTRACTUM GLYCYRRHIZÆ, *L. D. E.*

EXTRACT OF LIQUORICE.

Synonyme. Spanish or Italian juice.

Take of Liquorice, fresh and sliced, two pounds and a half.
Distilled water, boiling, two gallons.

Macerate for twenty-four hours; then boil down to a gallon, and strain the liquor while hot; lastly, evaporate to a proper consistence.

Remarks. — This is a well-known extract, of a dark colour and sweet taste. It is usually imported from Italy, and when it has been redissolved, strained, evaporated, and made into rolls about the thickness of quills, it is employed, under the name of *refined liquorice*, as a demulcent in tickling coughs. Liquorice grows abundantly near Pomfret, in Yorkshire, and a fine extract is prepared in that town, and made into thin round lozenges, under the name of "Pomfret Cakes."

GLYCYRRHIZA GLABRA (Diadelphia Decandria; Leguminosæ).

Description. — *Liquorice-root* is long and slightly tapering, and is brought to the market in pieces from one to three feet in length, and diminishing in size from the thickness of the little finger at one end, to that of a goose-quill at the other. It is tough, woody, and very flexible; yellowish-white internally, and brown externally.

Composition. — Liquorice contains a peculiar sugar, called *glycyrrhizin*, which is a yellow transparent substance, extremely sweet, readily dissolves in water and alcohol, and combines also with acids and alkalies, and occasions precipitates in most metallic salts.

EXTRACTUM HÆMATOXYLI, *L. E.*

EXTRACT OF LOGWOOD.

Synonyme. Extractum Ligni Campechiensis.

Take of Logwood, sliced, two pounds and a half.
Distilled water, boiling, two gallons.

Prepare this extract in the same manner as Extract of Liquorice.

Remarks. — This extract is of a deep red colour, and has a sweetish astringent taste. It becomes very hard by keeping, so that pills made of it pass through the body unchanged.

Composition. — Logwood contains a peculiar colouring principle called *hematin*; it separates from the aqueous solution in small reddish crystals, which have a bitter astringent taste. These crystals are sometimes found in the wood when it is split.

Properties.—*Astringent.* It is not so liable to derange the digestive organs as some other astringents, and may therefore be used for a much longer period. The decoction is the best form for its administration.

Uses. — In *chronic diarrhœa* and *dysentery* it is very useful. It may be taken as a regular article of diet, combined with an equal quantity of milk, in these diseases, and its use may be long continued. Administered in this form, it has been found, in the Dreadnought hospital-ship, more serviceable than any other vegetable astringent in this most intractable disease.

Dose. — Of the recent extract, gr. x to gr. xxx; of the decoction, f℥viii to f℥xvi, in the day.

EXTRACTUM HYOSCYAMI, *L. D. E.*

EXTRACT OF HENBANE.

Prepare this in the same way as Extract of Aconite.

HYOSCYAMUS NIGER (Pentandria Monogynia; Solanaceæ).

Description. — Hyoscyamus is a low plant, which has a peculiar fœtid odour, and a clammy disagreeable feeling. The leaves are large and deeply incised, the margin being smooth, and not serrated. Mr. Houlston, who has paid great attention to the subject, says that the leaves are not fit for use the first year of the plant's life. They are then called "seedlings," are not clammy or fœtid, and have a footstalk. The second year they become clammy and fœtid, and lose their footstalk, becoming sessile, and embracing the stem. At this period their medicinal powers are much the greatest.* The second year's leaves are indicated by the pharmacopœial characters, —

"*Sessile;* oblong; deeply serrated; *downy, with viscid, fœtid hairs.*"

The *seeds* are small, round, finely dotted, and yellow, and more powerful than the leaves.

Leaves for which it may be mistaken. — *Belladonna* and *digitalis.* The distinguishing characters are given in the article INFUSUM DIGITALIS.

Composition. — *Hyoscyamia*, a crystalline alkaloid, which closely resembles atropia, and an *empyreumatic oil*, which is a powerful narcotic.

Medicinal properties. — *Acrid; narcotic; anodyne; sedative.* In *small* doses it allays pain, and causes sleep. There is some difference of opinion as to whether it produces sleep directly, or only through the ease which it affords. It does not quicken the pulse, or cause headache, constipation, or suppression of the secretions. Dr. Marshall Hall commends it as useful in allaying the irritable state, sometimes accompanied by delirium, which results from great loss of blood. It corrects the tendency of compound extract of colocynth and other powerful cathartics to produce griping, and even appears to promote their purgative effects. In *large doses* it occasions some degree of dryness in the throat, nausea, giddiness, *dilatation* of the pupil, and *delirium*, sometimes of *maniacal* character. In some habits, even small doses are liable to produce headache. It is a useful antispasmódic, and when applied to the eye it dilates the pupil.

Characteristic effects.—Sedative, generally without causing headache or constipation. The delirium which a poisonous dose excites is of a *furious* character. It differs from opium in the first of these characters, and from belladonna in the last, as well as in being less acrid, and causing less dryness of the throat.

Antidotes. — Emetics; then vegetable acids, or vinegar.

Uses. — *To cause sleep or allay pain or cough*, when opium is inadmissible or objectionable. In *mania*, combined with camphor (*Dr. A. T. Thomson*); in *dysmenorrhœa*, combined with two grain doses of the same article (*Dr. Bright*); in *hysterical* pains combined with compound tincture of valerian. To *correct the griping of active cathartics;* to *dilate the pupil*, but it is seldom used for this purpose in this country; as an *anodyne fomentation to painful tumours or inflamed glands*. It is a safer anodyne for *children* than opium.

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* Lancet, 1840-41, vol. ii. p. 232.

Dose.—Of the extract, gr. ij, carefully increased to gr. x; of the tincture, ♏xv to ♏xxx or fʒj.

Remarks upon the extract.—This is very liable to vary in strength. It generally has a dark colour, and a peculiar characteristic odour.

EXTRACTUM (SIVE RESINA, *E.*) JALAPÆ, *L.*

EXTRACT (OR RESIN, *E.*) OF JALAP.

Take of Jalap, powdered, two pounds and a half.
Rectified spirit, a gallon.
Distilled water, two gallons.

Macerate the jalap root in the spirit for four days, and pour off the tincture. Boil down the residue in the water to half a gallon; afterwards strain the tincture and the decoction separately, and let the latter be evaporated, and the former distil, until each thickens. Lastly, mix the extract with the resin, and evaporate to a proper consistence.

This extract should be kept *soft*, which may be fit to form pills; and *hard*, which may be rubbed to powder.

E. Take any quantity of powder-jalap; moisten it thoroughly with rectified spirit; put it in twelve hours into a percolator, and exhaust the powder with rectified spirit; distil off most of the spirit, and evaporate the remainder sufficiently.

Remarks.—The rectified spirit is employed to extract the resin from the jalap, and the water to dissolve the gummy extractive. By mixing the two extracts thus obtained, the jalap-resin is intimately divided, and prevented from griping so much as would be the case, were it administered alone. This object might be obtained by mixing the resinous extract with sulphate of potash, sugar, almonds, or any substance which would minutely divide it. The Ed. Ph. directs merely the resin to be extracted.

Jalap-roots (*tubers*) are attacked by a worm, which eats merely the gummy and starchy portions, leaving the resin untouched. These worm-eaten pieces are therefore more active and valuable for making the extract than sound ones.

Brande gives 18 per cent. as the proportion of alcoholic, and 50 per cent. as the proportion of aqueous extract. The Edinburgh extract is therefore four times as strong as that of the London Pharmacopœia.

Adulteration.—Jalap resin is frequently adulterated with resin of guiacum. M. Gobley states that as small a mixture as 2 per cent. may be detected as follows:—dissolve a small quantity of the suspected resin in boiling alcohol; soak a strip of paper in the solution, and expose it to a *feeble* current of nitrous gas; if any guiacum resin is present, the paper becomes blue. If the current of gas is too strong, the colour disappears almost as quickly as it is formed.*

Medicinal properties.—The resin is the purgative principle in jalap, and the watery extract does not increase its cathartic properties, but is supposed to be diuretic. For general medicinal properties and uses, see PULVIS JALAPÆ COMPOSITUS.

Dose.—Gr. x to ℈j. The Edinburgh extract being nearly four times as strong as that of the Lond. Coll., the dose will be proportionate.

EXTRACTUM KRAMERIÆ, *E.*

EXTRACT OF RHATANY ROOT.

This is to be prepared from Rhatany root, in the same way with that of Liquorice root.

Medicinal properties and uses.—*Astringent.* See INFUS KRAMERIÆ.

Dose.—Gr. x to gr. xxx.

EXTRACTUM LACTUCÆ, *L.*

EXTRACT OF LETTUCE.

Prepare this in the same way as Extract of Aconite.

LACTUCARIUM, LACTUCA SATIVA (Syngenesia Polygamia Æqualis; Compositæ).

Preparation.—Before the flowering stem of the lettuce springs up, the plant contains a large quantity of a clear, bland, cooling juice; but, afterwards, it yields an intensely bitter juice, which is colourless and pellucid whilst in the vessels of the plant, but becomes milky when exposed to the air, and ultimately acquires a brown colour and odour, resembling that of East Indian opium. When incisions are made in the flowering stem, this juice exudes, and when dried, constitutes lactucarium.

Description.—Lactucarium is in round pieces, sometimes the size of the fist. It is dark brown, and has an odour and bitter flavour closely resembling those of East Indian opium.

Composition.—*Bitter principle* (*lactucin* only slightly soluble in water, soluble in alcohol and æther; *wax*, *resin*, and *caoutchouc*. No morphia has been found in it, though it has been carefully sought for.

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* Chemist, vol. iv. p. 280.

Medicinal properties. — *Sedative*; *hypnotic*; *anaphrodisiac*.

Characteristic effects. — Lactucarium produces sleep and allays pain *without exciting the circulation*, or causing the disagreeable effects of opium upon the head. It reduces the heat of the body, and the frequency of the circulation, but is not so certain or powerful in its effects as opium or morphia.

Uses. — All those cases in which opium is objectionable from the presence of vascular excitement, or in which it cannot be borne from peculiarities in the patient. As a sedative in the wakefulness of fever, and to allay the cough and feverish excitement of phthysis, it has often been used with great advantage. Some persons have relieved the night wakefulness, which is not uncommon in old age, by eating lettuce at supper.

Dose. — Gr. ij to gr. vi, in pill; much larger doses have sometimes been given.

Remarks upon the extract. — This is much less powerful than lactucarium, but it has the same properties, and is used in the same cases.

Dose. — Gr. iij to gr. x, or more.

EXTRACTUM LUPULI, *L. E.*

EXTRACT OF HOP.

Synonyme. Extractum Humuli.

Take of Hops, two pounds and a half.
Boiling distilled water, two gallons.
Prepare it in the same way as Extract of Liquorice.

Remarks. — It is doubtful whether this extract contains any narcotic properties. It is, however, a good bitter, and is used as such.

Dose. — Gr. v to gr. x or ℈j.

EXTRACTUM NUCIS VOMICÆ, *L. E.*

EXTRACT OF NUX VOMICA.

Take of Nux vomica, eight ounces.
Rectified spirit, three pints.

Apply steam to the nux vomica, so that it may be softened. Afterwards bruise it, cut it into thin slices, and dry it, and macerate it for seven days in two pints of the spirit; express the tincture, and strain. Macerate what is left again in the remaining spirit for three days; then express again, and strain. Let the greater part of the spirit distil from the tinctures mixed together, and let what remains be evaporated to a proper consistence.

Ed. Expose it to steam till it is completely softened; slice it, dry it thoroughly, and immediately grind it in a coffee mill. Exhaust the powder, either by percolating with rectified spirit, or by boiling it with repeated portions of rectified spirit, until the spirit comes off free from bitterness. Distil off the greater part of the spirit, and evaporate what remains in the vapour-bath to a proper consistence.

Medicinal properties and uses.—This extract, which is for the first time introduced into the London Pharmacopœia, is a most valuable form for the exhibition of nux vomica, and is, in many respects, preferable to strychnine, as being more uniform in its effects, and more manageable in its doses. For the general medicinal effects, see STRYCHNINE, p. 196. I shall here only mention one disease, in which I have found this medicine of great value, that is, the *atonic diarrhœa* of infants and children, such as we see in town workhouses, in which the pallor of the skin, and the general appearance, with sometimes prolapsus of the rectum, indicate loss of nervous and muscular power. In these cases, the food passes through the bowels almost unchanged, and there is constant diarrhœa from loss of power in the bowels to digest, and in the spincter ani to retain their contents. In these cases, I have observed the most marked benefit from the following prescription:—

Ext. of nux vomica, gr. ¼ to gr. ss (according as it is an infant or a young child); saccharated carbonate of iron, gr. j; ext. of gentian, sufficient to make a pill. To be repeated three times a day.

If the motions are offensive, a quarter of a grain of blue pill and half a grain of rhubarb may be added. I have generally observed improvement before a dozen pills have been taken, and have never found more than two dozen required in any case in which they have done good. If not quickly beneficial, I have not observed any advantage derived from a continued use of this remedy.

Dose.—Gr. ¼ to gr. ss. The former dose is perfectly safe, even for young infants, and I have not had occasion to give a larger dose than the second. It may be given to the extent of gr. j to gr. ij, carefully watching its effects.

EXTRACTUM OPII, *L.E.* (AQUOSUM, *D.*).

(WATERY, *D.*) EXTRACT OF OPIUM.

Synonyme. Extractum Opii purificatum, *Ph. L.* 1836. Extractum Thebaicum.

Take of Opium, sliced, one pound and a half.
Distilled water, five pints.

Add two pints and a half of the water to the opium, and macerate for twenty-four hours, frequently stirring with a spatula; then strain. Macerate what is left in the remaining water for twenty-four hours, and strain. Lastly, evaporate the strained liquors to a proper consistence.

Remarks.— By maceration, water dissolves the odorous principle of opium, the salts of morphia and codeia, the narcotine, and the gummy and extractive matters; but not much of the resin. When the solution is evaporated, the odorous principle is driven off, and the narcotine combines with the resin, and becomes insoluble. The extract is, therefore, nearly devoid of smell, and is stronger than opium, from the separation of inert principles and of impurities.

Medicinal properties and uses.— Similar to those of opium; but it is thought to occasion less subsequent disturbance of the nervous system, and to be admissible in some cases in which opium itself is objectionable. It is to be preferred to opium for children and irritable constitutions. Pereira states that he had Mr. Battley's authority for saying that his sedative liquor of opium is merely an aqueous preparation made with heat.

Dose.— Though the extract is said to be more powerful than opium, the dose, which is generally recommended, does not correspond with this statement. It is usually directed to be given in doses of gr. j to gr. iv for an adult.

Officinal preparation.— Vinum Opii.

EXTRACTUM PAPAVERIS, *L. E.*

EXTRACT OF POPPY.

Synonyme. Extractum Papaveris.

Take of Poppy (capsules), bruised, the seeds being taken out, fifteen ounces.
Distilled water, boiling, a gallon.

Macerate for twenty-four hours; then boil down to four pints, and strain the liquor while hot; lastly, evaporate to a proper consistence.

Medicinal uses. — *Anodyne; narcotic.* This extract is less apt than opium to occasion nausea, headache, and delirium, and is therefore to be preferred for procuring sleep in diseases in which the head is much affected. It is also useful for children, but it is a feeble preparation.

Dose. — Gr. ij to ℈j.

EXTRACTUM PAREIRÆ, *L. E.*

Extract of Pareira.

Prepare this in the same way as Extract of Logwood.

Medicinal properties and uses. — See Infusum Pareiræ. The extract is usually given in conjunction with the infusion.

Dose. — Gr. x to ʒss.

EXTRACTUM QUASSIÆ, *E.*

Extract of Quassia.

This is to be prepared from quassia, in the same way as Extract of Liquorice-root.

Medicinal properties and uses. — *Bitter tonic.*

Dose. — Gr. v to ℈j.

EXTRACTUM RHEI, *L. D. E.*

Extract of Rhubarb.

Take of Rhubarb, powdered, fifteen ounces.
Proof spirit, a pint.
Distilled water, seven pints.

Macerate for four days, afterwards strain, and set by, that the dregs may subside. Pour off the liquor, and evaporate it, when the dregs have settled, to a proper consistence.

The Dublin and Edinburgh Colleges direct the rhubarb to be squeezed and macerated two or three times, and the solution each time to be strained through a cloth.

"It is obtained of a finer quality by evaporation in a vacuum with a gentle heat." *E.*

Remarks.—The purgative properties of rhubarb are much impaired in making this extract. It is chiefly used as a slightly aperient vehicle for forming other substances into pills.

Dose.— As a purgative, gr. x to gr. xxx.

EXTRACTUM SARZÆ LIQUIDUM, *L.*
(FLUIDUM, *D. E.*).

Fluid Extract of Sarsaparilla.

Synonyme. Extractum Sarsaparillæ Fluidum, *D.*

Take of Sarsaparilla, three pounds and a half.
Distilled water, five gallons.
Rectified spirit, two fluid ounces.

Boil the sarsaparilla in three gallons of the water down to twelve pints; pour off the liquor, and strain it whilst still hot. Boil the sarsaparilla a second time in the remaining water down to one half, and strain. Evaporate the mixed liquors to eighteen fluid ounces, and when the extract has cooled, add the spirit.

Ed. Sarza, in chips, ℔j; Boiling water, Ovi. Digest the root for two hours in four pints of the water; take it out, bruise it, replace it, and boil for two hours; filter and squeeze out the liquid; boil the residuum in the remaining two pints of water, and filter and squeeze out this liquor also; evaporate the united liquors to the consistence of thin syrup; add, when the product is cool, as much rectified spirit as will make in all sixteen fluid ounces; filter.

Dub. Sarsaparilla, ℔j; Boiling water, Oviii; Rectified spirit, q.s. Digest the sarsaparilla in five pints of water for two hours, at a temperature near 212°; and then decant; add the rest of the water; digest again for two hours, and decant; evaporate the mixed liquors, by a steam or water bath, to the consistence of a thin syrup; and, when the product has cooled, add as much rectified spirit as will make the entire twenty ounces.

Remarks.—The Dublin Ph. makes twenty fluid ounces, the Edinburgh sixteen, and the London about six fluid ounces from one pound of sarsaparilla. The fluid extract of the London Ph. is therefore more than three times the strength of that of Dublin, and about three times as strong as that of Edinburgh.

It is doubtful whether the long continuance of the heat does not impair the activity of the sarsaparilla in the preparation; but it is almost impossible to prove it from its effects; the value of this substance being so uncertain from many circumstances. It is seldom prescribed, except with other forms of sarsaparilla.

Dose.—f℥j to f℥ij or more.

EXTRACTUM SIVE RESINA SCAMMONII, *E.*

EXTRACT OR RESIN OF SCAMMONY.

Take any convenient quantity of scammony in fine powder; boil it in successive portions of proof spirit till the spirit ceases to dissolve any thing; filter; distil the liquid till little but water passes over; then pour away the watery solution from the resin at the bottom; agitate the resin with successive portions of boiling water till it is well washed; and, lastly, dry it at a temperature not exceeding 240°.

Remarks.—By solution in proof spirit, scammony is freed from adulterations (see EXT. COLOC. co.), and its activity thereby increased.

Dose.—Gr. v to gr. x or gr. xv.

EXTRACTUM STRAMONII, *L. E.*

EXTRACT OF STRAMONIUM OR THORNAPPLE.

Take of Stramonium seeds, fifteen ounces.
Distilled water, boiling, a gallon.

Macerate for four hours, in a vessel lightly covered, near the fire; afterwards take out the seeds, and bruise them in a stone mortar; return them when bruised to the liquor. Then boil down to four pints, and strain the liquor while hot. Lastly, evaporate to a proper consistence.

E. Grind the seeds well in a coffee-mill; rub the powder into a thick mass with proof spirit; put the pulp into a percolator, and transmit proof spirit till it passes colourless; distil off the spirit, and evaporate what remains in the vapour-bath to a proper consistence.

DATURA STRAMONIUM (Pentandria Monogynia; Solanaceæ).

Description.—Stramonium is a small green plant, about twelve or eighteen inches high, which grows upon dunghills. The *herb*, when dried, is chopped up, and may be recognised by the light green colour of the leaves mixed with the white pithy interior of the stalks, and portions of the oval fruit, which are covered with green spines, from a quarter to half an inch long. It is not likely to be mistaken for any other officinal herb. The *seeds* are small, flat, *kidney-shaped*, and pale or brown. There is a species of stramonium, common in America, and abundantly cultivated at East Church, in the Isle of Sheppey, Kent, which attains the height of several feet, and possesses much more powerful medicinal properties than the species which is indigenous in this country.

Composition.—*Datura*, a crystallisable, colourless alkali, which exists in much larger quantity in the seeds than in the herb. This powerfully dilates the pupil, and agrees in many of its properties with *hyoscyamia*.

Medicinal properties.—*Anodyne, and slightly irritant.* It allays pain, but does not directly produce sleep. In *poisonous* or *too large* doses it causes maniacal delirium, at first resembling intoxication; headache, dryness of the throat, difficulty of swallowing, perspiration, and diarrhœa. It *dilates* the pupil; and in America, where belladonna is scarce, and the stramonium more powerful, as above stated, than the English herb, it is always employed for this purpose, instead of belladonna, in ophthalmic practice. It produces little effect upon the pulse, but possesses great power in controlling spasmodic actions, and is on this account very useful in spasmodic asthma, and in chorea.[*]

Characteristic effects.—It strikingly resembles belladonna, from which it is distinguished by being somewhat less powerful as a narcotic, and by exerting a greater influence in exciting the secretions. Its characteristics are, that it allays pain, but does not cause sleep; it *dilates* the pupil and occasions slight headache; it relaxes the bowels and excites perspiration, and it controls spasmodic actions.

Uses.—Stramonium is chiefly used for the relief of spasmodic asthma, the herb being smoked like tobacco. If used on the approach of an attack, it sometimes cuts it short; but it should be employed regularly every night, in order to produce much benefit. Its effects should be watched, as it is not without danger. The extract is sometimes used both internally and externally to relieve *neuralgia*; but it is not equal to belladonna or aconite for this purpose. A decoction has been applied as a fomentation to painful sores. It ought not to be employed where there is any tendency to headache, or to apoplexy. In painful griping without inflammatory action of the bowels, it is sometimes very useful. It is given as a sedative in chorea, in the dose of one-sixth of a grain of the extract.[†]

Dose.—Two or three common pipefuls of the herb may be smoked at a time. It smokes quickly, producing an agreeable odour, and it does not require combining with any other substance, to promote its combustion. The dose of the powdered leaves is gr. j to gr. v, and of the seeds, half the quantity. Of the extract, a quarter of a grain, which must be increased according to the effects produced.

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[*] Dr. Graves, Med. Gaz. vol. xxiii. p. 109.

[†] Ibid.

EXTRACTUM STYRACIS, *E.*

EXTRACT OF STORAX (PREPARED STORAX, *L.*).

Take any convenient quantity of storax in fine powder; exhaust it by boiling it in successive quantities of rectified spirit; filter the spirituous solutions; distil off the greater part of the spirit; evaporate the remainder over the water-bath to the consistence of a thin extract.

Remarks.—Storax, as imported, contains woody matter and various impurities of which it is deprived by making the alcoholic extract. The evaporation should not be carried too far, as its flavour is impaired, when that is done.

Medicinal properties and uses.—See TINCT. BENZ.

Dose.—Gr. ij to gr. v. Storax is never prescribed alone.

EXTRACTUM TARAXACI, *L. E.*

EXTRACT OF DANDELION.

Prepare in the same way as Extract of Liquorice-root.

Description.—The dandelion abounds in a bitter milky juice, which is most abundant just before it flowers. The extract is a brown, soft mass, which has generally a peculiar sweet flavour and odour; though it is stated that its flavour is bitter.

Composition.—Caoutchouc, bitter matter, sugar, gum, and some salts of potash and lime.

Medicinal properties.—*Aperient*; *tonic*; and *alterative*. It is popularly considered to be diuretic, but this property is not so well marked as the others. It appears to act upon the biliary system.

Uses.—Taraxacum is chiefly used as a *deobstruent* in both *functional* and *organic diseases* of the *liver*; and is often beneficially employed in the *constitutional treatment of ulcers* which are rendered *unhealthy* by *disease* of *this viscus*. It is also given as an alterative tonic in some forms of *dyspepsia*. It is used for the treatment of *gall stones*; and is, in this disease, beneficially combined with nitric acid.

Dose.—Gr. x to ʒj. It is generally given in combination with sulphate of potash or other gentle aperient.

EXTRACTUM UVÆ URSI, *L.*

EXTRACT OF BEARBERRY.

Prepare this in the same way as Extract of Hops.

Medicinal use.—See DECOCTUM UVÆ URSI, p. 282.
Dose.—Gr. vi to ʒss. It is often added to the decoction.

INFUSA.

INFUSIONS.

INFUSIONS are mere solutions of vegetable matter in water, which is sometimes used cold, but in the London Pharmacopœia is in every instance directed to be boiling; in this state it is poured upon the substance, the active principles of which are intended to be dissolved. The aromatic, bitter, astringent, and mucilaginous properties of vegetable products are, to a considerable extent, soluble in water; while the resinous portions are, in most cases, totally unacted upon by it. It is now generally acknowledged that nearly all infusions may be made as well with cold as with hot water; and the cold infusion possesses several advantages, but a longer time is requisite for its preparation. Cold water dissolves all the soluble principles of vegetables except starch, but the mucilaginous ingredients are less readily soluble in it than in hot water. Hence, such infusions as those of calumba, buchu, gentian, pareira, and rhubarb, which contain either starch or mucilage in large proportion, keep much better when made with cold than with hot water, and are equally efficient. Infusion of linseed, on the other hand, should always be prepared with heat, as the mucilage is its important ingredient. Some difference of opinion prevails as to infusion of senna, but Battley and some others find that the cold infusion contains as much of the active principles as the hot. Most cold infusions have a more aromatic and agreeable flavour than those in which heat has been employed.

The substances infused should be only coarsely powdered, or cut into thin slices; for if they are employed in the state of fine powder, the infusion is with difficulty rendered clear.

Hard water should, when possible, be avoided, as it is a less powerful solvent than soft water; and it ought never to be kept *long boiling*, but a fresh portion should be used in each case, and should be employed as soon as it begins to boil. If it becomes turbid, immediately upon attaining this point it should be removed from the fire, and allowed to become clear. The transparent supernatant fluid should then be poured off, and boiled for use a second time.

Dried vegetables are stated to yield their virtues by infusion more readily than when they are in a recent state.

If infusions are long kept, and especially in hot weather, they become turbid, deposit the matter which they had dissolved, and undergo decomposition; they ought, therefore, never to be made for use longer than a few hours, but should be prepared for the occasion upon which they are prescribed.

The kind of vessel in which concentrated infusions are kept, is a matter of some consequence, as light acts upon them, and promotes their decomposition. I am told by Mr. Henry Evans, of Liverpool, that they can keep their concentrated infusions much longer in barrels or stone-ware bottles, than in bottles made of glass, as in the latter they become turbid and spoilt, though they remain unchanged in the former. There is also a difference in the effect of different colours in glass itself; for he showed me some infusions which had been exposed for eighteen months in a south-easterly window in *yellow* glass bottles, and there was no turbidity in any but one, whilst in bottles of other colours they become unfit for sale in a much shorter space of time.

INFUSUM ACORI, OR INFUSUM CALAMI.

INFUSION OF SWEET FLAG. (Not Off.)

Take of the Rhizome of the sweet flag, one ounce.
Boiling water, twelve ounces.
Macerate for an hour, and strain.

ACORUS CALAMUS (Hexandria Monogynia; Acoraceæ).

Description.—The rhizome of the sweet flag occurs in pieces four or five inches long, and slightly flattened vertically. On the *upper* side are the remains of the leaves, which *all slant towards one end*; and, on the *under* side, are a number of small elevated circles, surrounding small dark spots, from which the roots spring.

Roots for which it may be confounded.— *Veratrum album.* In this the remains of the leaves are *all at one end*, and sheath an *upright*, instead of a *horizontal* stem as in the acorus. (See ALKALIES,— VERATRIA, p. 201.)

Medicinal properties.— It is an *aromatic stimulant* and *mild tonic.*

Uses. — Sweet flag is seldom employed by physicians, but it has been much used in Norfolk, by the country people, for the cure of *ague*. It might well take the place of many more costly aromatic tonics, in *asthenic fevers*, and in *dyspepsia*, requiring this class of remedies. It has been sometimes used for making aromatic gargles, and *poultices* which have been applied to *ill-conditioned ulcers.*

Composition.— *Volatile oil, resin, extractive,* and *woody matter.*

Doses. — Of the powdered rhizome, ℈j to ʒj; of the infusion, f℥j to f℥ij. There is, however, no officinal preparation.

INFUSUM ANTHEMIDIS, *L. D. E.*

Chamomile Tea.

Take of Chamomile, five drachms. *L.* & *E.*
Distilled water, boiling, a pint.
Macerate for ten (twenty, *E.*) minutes, in a vessel lightly covered, and strain.

D.— Chamomile, ℥ss; Water, ℥xii. Infuse for fifteen minutes.

ANTHEMIS NOBILIS (Syngenesia Polygamia superflua; Compositæ; sub-ord. Corymbiferæ).

Description and varieties.—There are two kinds of chamomile flowers, *single* and *double.* The *single* are characterised by having but *one row of flat florets*, forming the *ray*; and the *disk* is much *larger* than in the double flowers. As the active properties reside in the central florets, and not those of the ray, the single flowers should be preferred, though the double ones look better; and are more popular on account of their appearance.

Medicinal properties.—*Stomachic* and *emetic.* The flowers, heated with boiling water, and enclosed in a muslin bag, are sometimes used as a soothing application to painful joints, or to allay the pain of toothache. The hot infusion is frequently employed for the same purposes.

Uses.— As a tonic in languid *dyspepsia.* The warm infusion *promotes the action of emetics.* As a stomachic, the infusion prepared with cold water is said to be more grateful than when made with hot.

Composition.— *Volatile oil; bitter extractive; tannin.*

Incompatibles.— Solutions of the salts of iron, mercury, silver, copper, or lead.

Doses.—As a stomachic, f℥ij to f℥vi; as an emetic, f℥viii to Oj.

ANACYCLUS PYRETHRUM, Anthemis Pyrethrum. Pellitory. (Syngenesia Polygamia superflua; Compositæ, sub-ord. Corymbiferæ.)

Description.— Pellitory root is in pieces three or four inches long, and a third of an inch thick. It is brown externally, mottled with black shining spots. Internally, it is pale yellow and radiated.

Composition.— The bark contains a peculiar inodorous *volatile oil*, which possesses all the properties of the root, and is probably the only active ingredient.

Roots for which it may be mistaken.— *Krameria* and *curcuma.* Krameria is much *longer* and *dark red.* Curcuma is *twice the thickness*, and *yellow.*

Medicinal properties.— *Sialogogue.* When chewed, it is at first insipid, but soon excites a burning sensation in the mouth, and an increased flow of saliva.

Uses.— A small piece is chewed to relieve congestions of neighbouring parts, as in some *forms of headache*, *chronic ophthalmia*, and *rheumatic affections* of the *face*, and *toothache*. It is sometimes used as a stimulating gargle in *relaxed sore throat*, and is chewed to relieve *paralysis of the tongue;* and it is employed by the native doctors in Hindostan for the cure of *palsy*.

Dose.— A piece weighing a few grains, may be chewed occasionally.

INFUSUM ARMORACIÆ COMPOSITUM, *L.*

COMPOUND INFUSION OF HORSERADISH.

Take of Horseradish, sliced,
Mustard, bruised, each, an ounce.
Compound spirit of horseradish, a fluid ounce.
Distilled water, boiling, a pint.

Macerate the horseradish and the mustard in the water for two hours, in a vessel lightly covered, and strain; then add the spirit.

COCHLEARIA ARMORACIA (Tetradynamia Siliculosa; Cruciferæ).

Description.— The horseradish belongs to the natural order Cruciferæ, which contains no plants that are not wholesome, or, at any rate, free from injurious qualities. They generally possess a pungent flavour, and are much used as nutritious articles of food, or as condiments. The root of the horseradish is long, white, and tapering; and remarkable for its pungency when chewed.

Roots for which it may be mistaken.—Aconite root has sometimes been eaten by mistake, but it is distinguished by the absence of pungency in the aconite. The large serrated leaves of horseradish are so different from the deeply cut leaves of the aconite that the mistake could only occur from gross ignorance if the plant is in leaf at the time the root is gathered.

Composition.— Acrid *volatile oil*, bitter *resin*, and *extractive*.

Medicinal properties.— *Acrid stimulant; sialogogue; diaphoretic* and *diuretic*. It produces a blister when applied to the skin, and the *infusion* sometimes *causes vomiting*. It excites the salivary glands when chewed, and is a favourite stomachic when eaten with various kinds of food, frequently *causing perspiration* and *diuresis*, when taken in this way.

Uses.—When chewed it relieves *hoarseness*, dependent upon relaxed uvula or velum palati. It has been used in *chronic rheumatism;* and in *palsy*, and *dropsy*, in consequence of its general stimulant, diaphoretic, and diuretic properties. The infusion is sometimes taken to *promote vomiting*, after the administration of emetics. It is considered to be *antiscorbutic*, and is used in *scurvy*.

Doses.—Of the root, ʒss or more, scraped into shreds, or chewed; of the infusion, f℥ss to f℥ij. The infusion soon decomposes.

INFUSUM ARNICÆ FLORUM. (Not Off.)

Take of arnica flowers, ʒj; Boiling water, ℥viss or *q. s.* Infuse for fifteen minutes, and strain. The infusion should measure f℥vj.

Or take of arnica flowers, ℥ss; Boiling water, ℔j. Infuse for an hour, and strain.

Remarks.—Both the above infusions are officinal in Continental Pharmacopœias. One is about twice the strength of the other.

Properties and uses.—See Tinctura Arnicæ.

Dose.—f℥ss or f℥j.

INFUSUM AURANTII COMPOSITUM, *L.D.E.*

Compound Infusion of Orange (Peel).

Synonyme. Infusum Aurantii, *E.*

Take of Orange peel, dried, half an ounce.
Lemon peel, two drachms.
Cloves, bruised, one drachm.
Distilled water, boiling, a pint.

Macerate for a quarter of an hour, in a vessel lightly covered, and strain.

D. Bitter orange peel, dried, ℥iij; Cloves, ʒss; Water, Oss. Infuse half an hour.

E. Bitter orange peel, dried, ℥ss; Lemon peel, fresh, ʒij; Cloves, ʒj; Water, Oj. Infuse fifteen minutes.

Medicinal use.—An agreeable *stomachic*, used principally as a vehicle for bitter tinctures, or for salines, or ammonia.

Dose.—f℥j to f℥ij.

INFUSUM BUCHU, *L.D.E.*

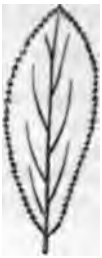
Infusion of Buchu.

Synonyme. Infus. Diosmæ, *Ph. L.* 1836.

Take of Buchu, an ounce.
Boiling distilled water, a pint.

Macerate for four (one, *D.*, two, *E.*) hours, in a vessel lightly closed, and strain.

BAROSMA CRENATA and other species (Pentandria Monogynia; Rutaceæ).



Barosma crenata, or Ovate Buchu.

Barosma serratifolia, or Linear-lanceolate Buchu.

Description and varieties.— Buchu leaves vary a good deal in shape, as they are not always obtained from the Barosma crenata alone, but also from other species, which agree with it in general and medicinal properties. Two forms are here shown.

Leaves for which it may be mistaken. — *Senna* and *uva ursi.* Its finely serrated edges distinguish it from both. Though called "crenated," its edges are really serrated, and not crenated. (See INFUS. SENNÆ.)

Composition.— Buchu leaves contain *volatile oil; bitter extractive* (diosmin), soluble in water; and *gum.*

Medicinal properties. — *Aromatic, stimulant* and *tonic; diuretic;* and *diaphoretic.* It appears to have a peculiar effect upon the urinary organs, acting topically upon them. It agrees with uva ursi in general properties, but is more aromatic. Its diuretic powers are very slight.

Uses.—Buchu is principally employed in *chronic affections of the urinary organs,* especially in cases attended with copious mucous secretion; as *chronic catarrh of the bladder.* In affections attended with *excessive secretion of lithic acid,* it is useful and tends to check the formation of this acid. It has occasionally proved useful in *irritable conditions of the urethra,* and in *gleet.* It is administered by the Hottentots in *chronic rheumatism.*

Incompatibles.— Preparations of iron.

Dose.— It is seldom given in powder; the dose may be ℈j or ʒss. Of the infusion, f℥j to f℥ij, generally combined with alkalies, as liquor potassæ.

INFUSUM CALUMBÆ, *L. D. E.*

INFUSION OF CALUMBA.

Take of Calumba, sliced, five drachms.
Distilled water, boiling, a pint.

Macerate for two hours, in a vessel lightly covered, and strain.

D. Calumba in coarse powder, ʒiij; *Cold* water, f℥ix. Macerate two hours.

E. Calumba in coarse powder, ℥ss; *Cold* water, Oj.

Moisten the powder, and pass cold water through it in a percolator, till sixteen ounces of infusion are obtained.

COCCULUS PALMATUS (Diœcia Hexandria; Menispermaceæ).

Description.—Calumba is sold in flat, oval, or circular pieces, one or two inches in diameter, which have a rough, elevated margin, and a depressed centre, composed of concentric circles. The colour is yellow. They are transverse slices of the root, and are from a quarter to half an inch thick, and are often worm-eaten.

Composition.—*Volatile oil*, *calumbin* (a crystallisable bitter principle), and a large proportion of *starch*, which causes the infusion to spoil quickly, on which account cold water is ordered in the Dub. and Edin. Ph., in order that, the starch not being dissolved, it may keep better. It contains no *tannin*.

Adulteration.—A root called false, or American calumba has sometimes been substituted for it; but it contains no starch and does contain tannin. It is distinguished by the infusion forming a blue precipitate with sulphate of iron, and a precipitate with gelatine, showing the presence of tannin: and by not becoming blue on the addition of iodine. It is remarkable that they should ever have been confounded, for the false root has no resemblance, in appearance, to the true one.

Medicinal properties.—*Tonic; aromatic.*

Characteristic properties.—It has considerable power in *allaying nausea*, or *sickness*; and, when combined with emetics, retards or prevents their operation. It is slightly *astringent* to the bowels, *checking diarrhœa*. In this respect, therefore, it is opposed to serpentary root, which is laxative. It is but slightly stimulant.

Uses.—Calumba is an elegant tonic in *dyspepsia*. In *bilious vomiting* and the *sickness of pregnancy*. In what are commonly termed "*bilious attacks*," combined with carbonate of soda and citric acid. In *fever*, accompanied with *sickness* or *diarrhœa*, when tonics are indicated. In the *latter stages of diarrhœa* and *dysentery*.

Dose and administration.—Of the infusion, f℥j to f℥jss; of the tincture, ♏xx to fʒj. It may be combined with the preparations of iron, as it *contains no tannin*. The infusion very quickly spoils.

INFUSUM CARYOPHYLLI, *L. D. E.*

Infusion of Clove.

Take of Cloves, bruised, three drachms (ʒij, *D.*)
Distilled water, boiling, a pint (f℥ix, *D.*).

Macerate for two hours, in a vessel lightly covered, and strain.

CARYOPHYLLUS AROMATICUS (Icosandria Monogynia; Myrtaceæ).

Description.—Cloves are the buds of the Caryophyllus aromaticus. They are about an inch long, and have a characteristic odour and flavour. The dried calyx is dark brown and rough, but the unexpanded bud is lighter coloured. They are collected by the hand, and dried in the sun.

Composition.—*Volatile oil.* This is obtained by distillation with water, and consists of two oils, one lighter, the other heavier, than water. *Caryophyllin* (resin), and *tannin.* This substance renders the preparations of iron incompatible with those of cloves.

The effects of tests upon infusion of cloves are important from their similarity to those produced upon opium and morphia. *Nitric acid reddens* it. It also reddens solution of opium.

Tincture of sesquichloride of iron renders both the infusion and the oil *blue*, and produces the same effect upon *morphia.* This test, however, renders *solution of opium blood-red.*

Medicinal properties.—*Aromatic* and *stimulant.* Cloves are not so fiery or acrid as pepper or ginger.

Uses.—Chiefly as a *condiment.* They are used medicinally to relieve *flatulence* or *sickness*, and to *correct* the *griping properties of purgatives.* The *oil* is stimulant, and is sometimes dropped into the hollow of a *carious tooth*, and is added to cathartic pills. When combined with *vegetable infusions, it retards their decomposition*, and is a constituent of ink to preserve it from becoming mouldy.

Incompatibles.—Preparations of iron.

Dose.—Two or three cloves may be swallowed in substance; of the infusion, f℥j to f℥ij; of the tincture, ♏xx to fʒj or fʒij; of the oil, ♏ij to ♏iv.

INFUSUM CASCARILLÆ, *L. D. E.*

INFUSION OF CASCARILLA.

Take of Cascarilla, bruised, an ounce and a half (℥j, *D.*).
Distilled water, boiling, a pint (Oss, *D.*).

Macerate for two hours, in a vessel lightly covered, and strain.

CROTON ELEUTERIA (CASCARILLA) (Monœcia Monadelphia; Euphorbiaceæ).

Description.—Cascarilla bark is in short quills from one to four inches long (seldom longer), and about twice the thickness of a goose quill. The edges are always turned in, but they do not often form a perfect quill. The pieces are often twisted longitudinally. The colour is pale brown, and the whitish *external cuticle* is *broken off* in many places, *exposing the internal bark*. It is characterised, also, by a number of *minute black lichens*, which form *black points* and small *streaks* upon the remaining *cuticle*. It breaks short, and not splintering, and has a fragrant odour when burned.

Barks for which it may be mistaken.—Pale cinchona bark. It is distinguished by the *shortness* of the pieces, and their harder and denser appearance; by the *irregular surface* which the *separation* of the *cuticle* causes; by the *minute black points and lines* upon the exterior, and by the absence of the leafy lichens which are found upon the cinchona bark; by the *absence* of the *regular circular transverse furrows* so common in cinchona, and by its *short even fracture*.

Composition. — *Volatile oil*, *cascarillina*, and *bitter resin*. No tannin.

Medicinal properties.—*Tonic* and *febrifuge*.

Characteristic properties.—Cascarilla is characterised by its *aromatic qualities*, which enable the stomach to retain it in preference to many other tonics. It is not equal to cinchona as a febrifuge. It *checks excessive secretions of mucus*.

Uses.—It is often combined with cinchona, and is also used alone in *irritable dyspepsia*. It is employed in *chronic bronchitis* and in chronic *diarrhœa* and *dysentery*, to diminish the undue secretion of mucus. It is especially useful in *diarrhœa occurring after measles*, and in the *gangrenous thrush of children* (*Dr. A. T. Thomson*).

Dose and administration.—The infusion is the best form. The dose is f℥j to f℥jss. It may be combined with preparations of iron, if desirable.

INFUSUM CATECHU COMPOSITUM, *L. D. E.*

COMPOUND INFUSION OF CATECHU.

Synonyme. Infusum Catechu, *E.*

Take of Catechu, powdered, six drachms.
Cinnamon, bruised, a drachm.
Distilled water, boiling, a pint.

Macerate for an hour (two, *E.*) in a vessel lightly covered, and strain.

E. Catechu powdered, ʒvi; Cinnamon powdered, ʒj; Syrup, f℥iij; Boiling water, f℥xvii. Macerate two hours.

Medicinal properties and uses. — *Astringent*, used in *diarrhœa*. The cinnamon adds to its astringency, and imparts its aromatic properties.

Dose.—f℥j to f℥ij, every four hours. It may be combined with opium or chalk, if necessary.

INFUSUM CHIRETTÆ, *D.E.*

INFUSION OF CHIRETTA.

Take of Chiretta, four drachms.
Boiling water, a pint.
Infuse two (one, *D.*) hours, and strain.

CHIRETTA or CHIRAYTA, AGATHOTES CHIRAYTA (Pentandria Digynia; Gentianaceæ). Herb and root.

Description.—Chiretta is a slender plant, which is pulled up by the root when it is in flower, and is dried whole. In this state it consists of smooth slender brownish stalks, mixed with the dried leaves and the flowers, which are each very small, and grow in clusters at different heights upon the stem.

Dried herbs for which it may be mistaken.—It most closely resembles *lobelia* in general appearance, but is browner, and the flowers are much smaller and not blue. When examined together, they are very easily distinguished.

Composition.—Bitter principle.

Medicinal properties and uses.—Intensely and disagreeably *bitter and tonic.* It is used in all the cases in which bitter tonics are prescribed.

Characteristics as a bitter. It is more bitter and less agreeable than gentian, and is said to be slightly laxative.

Dose.—Of the infusion, f℥j.

INFUSUM CINCHONÆ, *L.D.E.*

INFUSION OF CINCHONA.

Take of Yellow (crown or pale, *D.*; any species, *E.*) cinchona, bruised, one ounce.
Boiling distilled water, a pint (Oss, *D.*).
Macerate for two hours in a vessel lightly covered, and strain.

Medicinal properties and uses.—See ALKALIES,—QUINÆ DISULPH. p. 182, *et seq.*

Dose.—f℥j to f℥ij. The Dublin infusion is twice the strength of the London or Edinburgh preparation.

INFUSUM CINCHONÆ SPISSATUM, *L.*

Concentrated Infusion of Cinchona.

Take of Yellow cinchona, coarsely powdered, three pounds.
Distilled water, six pints.
Rectified spirit, as much as may be sufficient.

Macerate the cinchona in the same way in which it is directed to make the Extract of Cinchona, and strain. Evaporate the mixed infusions in a water-bath to a fourth part, and set by that the dregs may subside. Pour off the clear liquid, and strain what remains. Then mix and evaporate a second time, that the liquid may have a sp. gr. of 1·200. To this, when it has cooled, add the spirit gently, so that three fluid drachms may be added to each fluid ounce of the liquid. Lastly, set the liquid aside for twenty days, that it may be perfectly cleared.

Remarks.—This is a convenient form for making extempore infusions. According to the quantities employed, it ought to be about thirty-six times as strong as the common infusion; that is, two fluid drachms of this concentrated infusion should make an eight-ounce mixture, when filled up with water, but the strength of the preparation is liable to variety.

INFUSUM CINCHONÆ PALLIDÆ, *L.*

Infusion of Pale Bark.

Synonyme. Infus. Cinchonæ, *Ph. L.* 1836.

Prepare this in the same way as Infus. Cinchonæ.

Properties and uses.—See Alkalies,—Quinæ Disulph. p. 182, et seq.

Dose.—f ℥j to f ℥ij.

INFUSUM CINCHONÆ PALLIDÆ SPISSATUM, *L.*

Concentrated Infusion of Pale Bark.

Prepare it in the same way as the Concentrated Infusion of Cinchona.

Remarks.—See Inf. Cinchonæ Spissat. above.

INFUSUM CUSPARIÆ, *L.E.*

INFUSION OF CUSPARIA.

Take of Cusparia, bruised, five drachms.
Distilled water, boiling, a pint.
Macerate for two hours in a vessel lightly covered, and strain.

GALIPÆA CUSPARIA (Diandria Monogynia; Rutaceæ).

Description.—Cusparia, or Angustura bark (Cusparia febrifuga, Bonplandia trifoliata), is in thin pieces, from one to ten inches long, and half an inch or an inch broad. The edges of the pieces are generally turned slightly inwards, but perfect *quills* are rare. It is covered with a whitish-brown epidermis, which is easily removed by the nail; the inner surface is pale brown and *smooth*. Its transverse fracture is *very short* and even, and not splintering; the odour is *slight*, and the flavour is bitter and aromatic.

Barks for which it may be mistaken.—The only barks it at all resembles are *yellow cinchona*, *cascarilla*, and *canella*. It is much flatter and thinner, in proportion to its size, than the first, and the fracture is even instead of being splintery. It is four or five times the size of the second; is generally *entirely covered by epidermis*, and is much less twisted; and the epidermis is brownish, instead of being white, as in canella, which latter bark is three or four times the thickness of cusparia.

Adulteration.—The bark of the nux vomica, or false Angustura bark has been substituted for cusparia, and has produced fatal effects on the Continent. Very minute and accurate descriptions of the differences between them are given in Pereira's Mat. Med.; but as this fraud is not practised in the bark which comes to this country, I have not thought it necessary to give more than a slight sketch of the distinguishing characters.

Cusparia bark is in *quills*, or *flat* pieces, *straight*, or *slightly* bent, but the *false* bark is *twisted backwards*, like dried horn. The *true* bark has a *slightly disagreeable odour*, is *brittle*, *easily cut*, and *light*; the *false* bark has *no odour*, is *cut* or broken with *difficulty*, and is *dense* and *heavy*. The fractured surface of the *true* bark is *merely deepened* in colour by a drop of *nitric acid*, whilst the *false* bark is turned *blood-red* by this acid.

Composition.—*Volatile oil*; *cusparin* (angusturin, or bitter principle), which is rendered greenish-yellow by nitric acid, and is precipitated from its solution by tincture of galls; and *resin* which is coloured red by nitric acid. *No tannin.*

Medicinal properties.—*Aromatic*; *tonic*; and febrifuge.

Characteristic properties.—*Aromatic astringent.*—In *large* doses, *emetic*, whilst in small ones it allays sickness, almost as much as calumba. It is a valuable febrifuge, but is not equal to cinchona, though it can often be better borne, in consequence of its aromatic properties. It *restrains chronic mucous* discharges. It is often said *not* to possess *stimulant* properties; but I have frequently observed it cause feverishness in patients convalescing from typhus.

Uses.—In atonic *dyspepsia.* In the *bilious remittent fever* of hot climates. In *adynamic continued fever.* In *chronic bronchitis,* and in the *latter* stages of *diarrhœa* and *dysentery,* in which cases it is advantageously combined with nitric acid and laudanum.

Dose.—Of the infusion, f℥j to f℥ij.

INFUSUM DIGITALIS, *L. D. E.*

Infusion of Foxglove.

Take of Foxglove (leaves), dried, a drachm.
Spirit of cinnamon, a fluid ounce.
Distilled water, boiling, a pint.

Macerate the foxglove in the water for four hours, in a vessel lightly covered, and strain; then add the spirit.

E. Digitalis, dried, ʒij; Spirit of cinnamon, f℥ij; Boiling water, f℥xviii. Macerate four hours.

D. Digitalis, dried, ʒj; Boiling water, f℥ix. Infuse one hour.

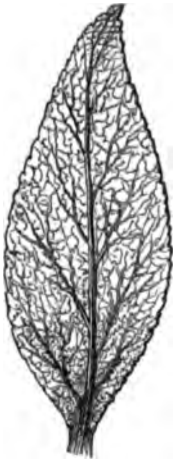
Remarks.—The London infusion is only half the strength of that of Dublin or Edinburgh.

Dose.—fʒij, carefully increased to f℥ss, or f℥j. Half the dose of the Dub. or Ed. infusion.

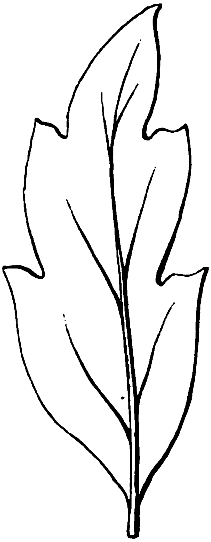
DIGITALIS PURPURÆA (Didynamia Angiospermia; Scrophularineæ).

Description.—Digitalis leaves are large and entire, from three to six inches long, and about a third as broad. When fresh, they are thick, soft, and downy; dark green on their upper surface, white and cottony on their under surface, which is very strongly marked by a prominent midrib, and the reticulations of the veins. The edges of the leaf are serrated. When dried they are not so easily distinguished.

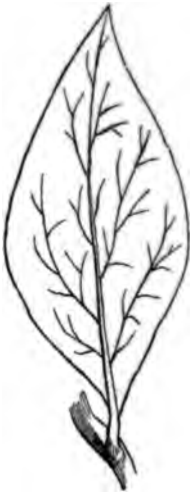
Leaves for which they may be mistaken.—*Hyoscyamus* and *belladonna;* from which they are distinguished by the following characters:—*Several leaves* are generally *united together* by the bases, where they have been all cut at the same time, as the leaves arise from the *same portion of the stem. Hyoscyamus* and *belladonna* leaves are generally separate, as they grow alternately at *different heights* upon the stem. If the dried *digitalis* leaf be carefully unfolded, its *serrated* edge may be traced, whilst *belladonna* has a smooth *entire* edge, and *hyoscyamus* has a *smooth edge*, from which *large portions* appear to have been *removed*. The *under* surface of *digitalis* has a *white cottony* appearance, and the *upper* surface is a *dark green*. *Hyoscyamus* is *pale green*, and there is scarcely any difference between the colour of the two surfaces. *Belladonna* has a *darker* hue altogether, and has *no white* surface. *Digitalis* has *exceedingly reticulated* veins: *hyoscyamus* has a *single* prominent midrib and vein which proceeds down the centre of each lobe; *belladonna* has *not reticulated* veins, but they are *more compound than* those of *hyoscyamus*.



Under surface of Digitalis.



Hyoscyamus.



Belladonna.

Adulterations.—The above are never intentionally substituted for digitalis, which is less expensive than either hyoscyamus or belladonna; but the leaves of *verbascum* or mullein have sometimes been gathered by mistake. The general form of the leaf is so similar to that of digitalis that they are not easily distinguished by description; but most species of verbascum have the leaf *very woolly* on both surfaces, digitalis only on the under one. The species which are woolly on one surface only, are not common; and even in them the woolly hairs are so much more abundant than in the foxglove, that they could scarcely be mistaken if once compared with each other.

The leaves ought to be gathered just when the plant begins to flower (June or July), the midribs should be cut out, and the expanded leafy parts dried quickly either in a drying stove or upon a dish or cloth before the fire. They soon become brittle, and may be rubbed into a coarse powder by the hands. This should be carefully excluded from air and light.

The *seeds* are *very small*, round and *brown*, and are much less used than the leaves.

Composition.—Digitalis contains a peculiar bitter principle, *picrin;* a crystallisable principle, *digitalin;* an *empyreumatic oil;* and *tannin.* It is probable that none of these alone is the active principle, but that the combination of the whole is necessary to the activity of the leaves.

Medicinal properties.—*Diuretic* and *sedative.* Digitalis frequently, but not always, raises the pulse in the first instance; but its ultimate effect is to lower it to 40 or 50 beats in the minute. It excites diuresis, and is a most valuable diuretic. It acts *most favourably* upon *weak flabby* subjects, or those in whom the strength has been broken up by mercury or disease. It does *not act* as a diuretic upon strong, *tense-fibred* people; and with such, bleeding must be premised. It is *most useful* in *anasarca* dependent upon heart disease, or upon general causes, or bronchitis; and is *not so useful* in *ascites* or *hydrothorax*, or in *dropsy of the heart*, or of the *arachnoid membrane.* It is a *cumulative* poison, or one which does not produce any effect until it has been continued for some time, when it occasionally acts with unexpected violence. The symptoms of poisoning by the too long employment, or too large dose of digitalis, are *disordered vision*, objects appearing green; *giddiness, nausea, feeble, intermittent pulse, anxiety*, sometimes *convulsions*, and *dilated pupil.* If these symptoms occur, the use of the medicine should be at once discontinued; the *recumbent posture most rigorously enforced*, and ammonia and opium must be given. The necessity for the recumbent posture springs from the circumstance, that rising to the erect posture raises the pulse suddenly to above a hundred beats in a minute, and has been followed by mortal fainting. The danger has, however, been much over-estimated. There is, indeed, scarcely a case on record of death resulting from it. When *long continued*, it sometimes *causes salivation*, and has occasioned vomiting and purging. Christison remarks that its diuretic effects very seldom occur if it produces much depression of the circulation. He thinks the two effects are incompatible with each other.

Characteristics as a diuretic.—Digitalis is characterised by its depressing influence upon the circulation, and by its liability to produce suddenly violent effects after appearing for some time to be inert. It does not act so favourably upon strong as upon debilitated subjects, and fails less frequently than any other diuretic to excite an increased secretion of urine.

Uses.— In *anasarca* and *dropsies* generally, especially in those dependent upon disease of the heart or kidney. As the constitutions in which it acts most beneficially are those which are broken down or enfeebled, it is often advantageously combined with tincture of sesquichloride of iron, notwithstanding the apparent incompatibility of a preparation of iron with a substance containing tannin. In *fevers*, when the vascular excitement is disproportioned to the other symptoms. In *mania*, to relieve restlessness; in which disease it must be given in *large* doses (*Dr. A. T. Thomson*). The tincture has been employed in *acute rheumatism*, in doses of ʒij or ℥ss, once in the day, and repeated the next day if necessary; but it is not often used in this disease. In *diseases of the heart and in aneurisms*, it is given to tranquillise the circulation; and in *palpitations*, dependent upon organic or functional causes.

Doses and administration.— In order to produce its diuretic effects, Dr. Christison prescribes small doses, thrice daily, and these must be continued two or three days before diuresis occurs. Its sedative effects are best produced by moderate doses, five or six times daily. To promote its diuretic powers, squill, calomel, or blue pill, or bitartrate of potash, are added. It is desirable to combine an aromatic to prevent it from causing nausea. It may be given, in conjunction with iron as before mentioned, or with nitric acid; and during its use, diluents should be employed.

Dose.—Of the powdered leaves, gr. j to begin with, which may be increased to gr. ij or gr. iij, if very carefully watched; of the infusion, fʒij to f℥j; of the tincture, ♏x to ♏xxx. In mania, a much larger dose may be safely given, as f℥j; and in acute rheumatism, as has been mentioned, fʒij to f℥ss, once in the day. The Dublin and Edinburgh infusion is twice the strength of the London one, and must be given accordingly.

INFUSUM ERGOTÆ, *D.*

INFUSION OF ERGOT, OR OF SECALE.

Take of Ergot of rye, in coarse powder, two drachms.
Boiling water, nine ounces.
Infuse for one hour in a covered vessel, and strain.

Medicinal properties and uses. — See TINCT. ERGOT. ÆTHER.

Dose.—f℥j to f℥ij, every quarter of an hour, or every three or four hours, according to the object of its administration.

INFUSUM GENTIANÆ COMPOSITUM, *L. D. E.*

COMPOUND INFUSION OF GENTIAN.

Synonyme. Infusum Gentianæ, *E.*

Take of Gentian, sliced,
Orange peel, dried, each, two drachms.
Lemon peel, four drachms.
Distilled water, boiling, a pint.

Macerate for an hour, in a vessel lightly covered, and strain.

D. Gentian root, orange peel, dried, of each, ʒij; Boiling water, Oss.

E. Gentian, ℥ss; Bitter orange peel, dried, ʒj; Coriander, ʒj; Proof spirit, f℥iv; *Cold* water, ℥xvi. Pour the spirit upon the solids; in three hours add the water; and in twelve hours more, strain.

Remark.—Both the Dublin and Edinburgh infusion is twice the strength of the London one.

GENTIANA LUTEA (Pentandria Digynia; Gentianaceæ).

Description.—Gentian root is in pieces, from a few inches to two feet long, and generally about the thickness of the thumb, but it is sometimes much thicker. It is deeply wrinkled externally, and is tough and flexible; internally, it is spongy. Its colour externally is brown and internally yellow, and its taste is intensely bitter.

Composition.—*Volatile oil* (very little); *gentianin* (bitter principle); *sugar*, which enables fermentation to take place in the infusion, and an intoxicating liquor to be made from it, which is much admired by the Swiss; and *mucilage* (pectin), which causes the infusion quickly to become ropy and spoiled. On this account the Ed. Ph. directs it to be made with *cold* water and spirit, whereby the mucilage is left behind undissolved. *No tannin.*

Medicinal properties.—*Bitter tonic.*

Characteristic properties.—It has no aromatic principle, nor any astringency. It is slightly *laxative*, and in large doses causes irritation of the stomach, or vomiting. It excites the circulation, and is not well adapted to irritable or inflammatory habits.

Uses.—Chiefly in *atonic dyspepsia*, and in the condition of the digestive organs produced by habitual indulgence in eating or drinking. The infusion is sometimes taken to allay the sinking and craving felt on the discontinuance of wine by a person who has been long accustomed to its use.

Dose.—Of the infusion, f℥j to f℥ij, three or four times daily.

Remarks on the infusion.—This very quickly spoils, especially in hot weather, and should, therefore, be made only in small quantities. The addition of the orange and lemon peel makes it more agreeable, without altering its properties.

It may be combined with chalybeates if desirable.

INFUSUM JUNIPERI, *D.*

INFUSION OF JUNIPER.

Take of Juniper berries, bruised, one ounce.
Boiling water, half a pint.
Infuse for one hour in a covered vessel, and strain.

Medicinal properties and uses. — *Diuretic.* See Spt. Junip. co.
Dose. — f ℥j to f ℥ij.

INFUSUM KRAMERIÆ, *L. D.*

Infusion of Rhatany.

Take of Rhatany, an ounce.
Distilled water, boiling, a pint, (f ℥xviii, *D.*).
Macerate for four (one, *D.*) hours, in a vessel lightly covered, and strain.

KRAMERIA TRIANDRIA (Tetandria Monogynia; Polygaleæ).

Description. — Rhatany root is generally met with in pieces a few inches long, and varying from the thickness of a quill to that of the little finger. It is of a deep brownish-red colour externally, contains a large proportion of bark, and is generally splintered at the ends of the pieces.

Composition. — *Tannic acid*, and a very small proportion of *gallic* acid. The bark contains more tannic acid than the wood, and hence the smaller roots, which contain most bark in proportion, are the best.

Medicinal properties. — Powerfully *astringent.*

Uses. — All the cases in which astringents are generally employed, especially chronic *hæmatemesis* and *hæmorrhages. Chronic mucous discharges*, *colliquative sweats* and *incontinence of urine.* It is valuable as a local astringent to check hæmorrhages from the nose or from wounds, and is much used as a dentifrice to give firmness and a red colour to the gums.

Dose. — Of the powdered root, gr. x to ʒss; of the infusion, f℥j to f℥ij.

Incompatibles. — Preparations of iron and acids, as they precipitate the tannin.

INFUSUM LINI COMPOSITUM, *L. D. E.*

Compound Infusion of Linseed.

Synonyme. Infusum Lini, *E.*

Take of Linseed, bruised, six drachms.
Liquorice, fresh sliced, two drachms.
Distilled water, boiling, a pint.
Macerate for four hours, near the fire, in a vessel lightly covered, and strain.

D. Linseed, ℥j; Liquorice-root, ℥ss; Water, Oiss. Boil for ten minutes, and strain whilst hot.

LINUM USITATISSIMUM (Pentandria Pentagynia; Linaceæ).

Description. — Linseed is obtained from the Linum usitatissimum or common flax.

Composition. — The outer or tegumentary parts of the seed contain mucilage; the seed leaves (cotyledons), fixed oil. Boiling water extracts the mucilaginous portions, and forms a thick, smooth, almost gelatinous solution. The oil is obtained by crushing the seeds, and then heating them to about 200° F. and expressing the oil.

Properties and uses. — *Linseed mucilage* (*linseed tea*) is *demulcent* and *nutritious*. It is much employed to allay the irritation of the mucous membranes in *bronchitis* or *catarrh*, in gonorrhœa, dysentery, and *alvine discharges*. It is rendered more pleasant, by the addition of liquorice, sliced lemon, and sugar-candy.

Linseed oil is usually amber-coloured; but it may be obtained colourless. It is seldom used internally, but is employed when mixed with lime-water, as a popular, but dirty and objectionable application to burns and scalds. It possesses the property of soon becoming dry when exposed to the air, and forming a transparent varnish. This is much increased if the oil is previously boiled, either alone, or with oxide or acetate of lead. This drying depends upon the increased absorption of oxygen (*Saussure*, quoted by *Turner*); upon the absorption of oxygen being prevented (*Liebig*, quoted by *Pereira*).

Linseed meal. — See Cataplasma Lini, p. 229.

Dose. — Of the infusion, *ad libitum*.

LINUM CATHARTICUM, Purging Flax (Class and order as above).

Description, &c. — Purging flax is a slender plant, about nine inches high, with small white flowers, resembling common flax in every thing but colour. It is uncertain as a cathartic, and is scarcely ever used in medicine, though still employed by country goodwives.

Dose. — A handful of the fresh herb may be made into infusion.

INFUSUM LUPULI, *L.*

Infusion of Hop.

Take of Hops, six drachms.
Distilled water, boiling, a pint.
Macerate for four hours, in a vessel lightly covered, and strain.

Medicinal uses. — *Tonic; stomachic;* and slightly *narcotic.*

Dose. — f℥j to f℥jss. (See Tinctura Lupuli.)

INFUSUM MATICO, *D.*

INFUSION OF MATICO.

Take of Matico leaves, cut small, half an ounce.
Boiling water, half a pint.
Infuse for an hour in a covered vessel, and strain.

ARTANTHE ELONGATA (Diandria Monogynia; Piperaceæ).

Description.—Matico consists of the dried leaves packed in bundles; and, in its general appearance, at first sight resembles dried digitalis leaves. When, however, it is moistened and spread out, it is seen to consist of leaves acutely tapering to one end, longer and narrower than those of foxglove. The upper surface is of a dark yellowish-green colour, and rough from innumerable small round papillæ, whilst the under surface is reticulated by a prominent midrib and distinct and separate veins. The *under* surface is *more powerful*, medicinally, than the upper.

Composition.—The only important constituents are *tannin* and *gallic acid.*

Medicinal properties.—Powerful *styptic* and *astringent.*

Uses.—This drug was introduced to the notice of the profession by the late Dr. Jeffrey, of Liverpool, who collected numerous testimonies in favour of its powerful properties in suppressing bleeding from *wounds*, *leech bites*, &c., when applied locally, the *under* surface of the leaf being pressed upon the bleeding surface; and in checking internal hæmorrhage from the nose, bowels, and uterus, when an infusion was swallowed. It deserves more extensive trial in these diseases than it has yet received. It has not hitherto been used in mucous discharges, so that its efficacy in them has not been tested.

Dose.—Of the infusion, f℥j to f℥ij, several times daily, according to the effect produced.

Incompatibles.—Salts of iron.

INFUSUM MENTHÆ VIRIDIS, *D.*

INFUSION OF SPEARMINT.

Take of Spearmint, dried, and cut small, three drachms.
Boiling water, half a pint.
Infuse for fifteen minutes in a covered vessel, and strain.

Medicinal properties and uses.—This is chiefly used as a vehicle. It is considered to be emmenagogue, and is slightly antispasmodic.

Dose.—f℥j to f℥ij.

INFUSUM PAREIRÆ, *D. E.*

INFUSION OF PAREIRA.

D. Take of Pareira root, bruised and torn into shreds, half an ounce.
Boiling water, nine ounces.
Macerate for one hour, in a vessel lightly covered, and strain.

E. Pareira, ℥vi.
Boiling water, Oi.
Infuse two hours.

Medicinal uses. — Employed in cases of irritation of the bladder and *catarrhus vesicæ.*

Dose. — f℥j to f℥jss, twice or thrice a day. The activity of the infusion may be increased by the addition of the extract. (See DECOCT. PAREIRÆ.)

INFUSUM POLYGALÆ, *D.*

INFUSION OF POLYGALA, see INFUSUM SENEGÆ.

INFUSUM QUASSIÆ, *L.D.E.*

INFUSION OF QUASSIA.

Take of Quassia, sliced, two scruples (ʒijss, *D.*; ʒj, *E.*).
Distilled water, boiling, a pint.
Macerate for (one, *D.*) two hours, in a vessel lightly covered, and strain.

PICRÆNA (QUASSIA) EXCELSA (Decandria Monogynia; Simarubiaceæ).

Description. — Quassia chips have a light yellow colour, are inodorous, and have an intensely bitter taste. They resemble sassafras in appearance, but are at once distinguished by the absence of smell.

Composition. — A trace of volatile oil; a peculiar bitter principle, *quassite; various salts*, but *no tannin.*

Medicinal properties. — *Pure bitter; tonic;* and *stomachic.* It appears to be *narcotic* to flies, and an infusion is used to kill them; but it is very doubtful whether it possesses any power of this sort over man.

Characteristics. — Pure bitter. It does not stimulate or irritate the digestive organs. It contains no tannin, and hence the salts of iron may be used in combination with it.

Uses. — In *atonic dyspepsia* and want of appetite. In those cases in which bitters are generally employed.

Dose. — Of the infusion, f℥j to f℥ij. The Edinburgh infusion is rather stronger, and the Dublin infusion is three times the strength of that of London.

INFUSUM RHEI, *L. D. E.*

INFUSION OF RHUBARB.

Take of Rhubarb, sliced, three drachms.
Distilled water, boiling, a pint.

Macerate for two hours, in a vessel lightly covered, and strain.

D. Rhubarb sliced, ʒij.
Boiling water, f℥ix.
Infuse one hour.

E. Rhubarb coarsely bruised, ℥j.
Spirit of cinnamon, f℥ij.
Boiling water, f℥xviii.
Infuse twelve hours, add the spirit, and strain.

Medicinal uses. — *Stomachic ; tonic ;* and *purgative.*

The alkalies darken the colour of this infusion, but do not decompose it. Aromatic spirit of ammonia is a pleasant addition to it. The infusion is clear whilst hot, but becomes turbid on cooling, owing to the deposition of some of the rhabarberic acid, tannin, and tannate of starch. It is not nearly so strong as the powder, and is frequently used as a vehicle for other purgatives.

Dose. — f℥j to f℥iij, to be repeated, if necessary. The Dublin infusion is one fourth stronger than that of London, and the Edinburgh is nearly three times as strong, besides containing the spirit of cinnamon.

INFUSUM ROSÆ, *E.*

Same as INF. ROSÆ COMP. below.

INFUSUM ROSÆ ACIDUM, *D.*

Take of Gallic rose petals, dried, two drachms.
Dilute sulphuric acid, one fluid drachm.
Boiling water, half a pint.
Infuse for one hour.

INFUSUM ROSÆ COMPOSITUM, *L.*

COMPOUND INFUSION OF ROSE.

Take of Rosa Gallica, dried, three drachms.
Diluted sulphuric acid, a fluid drachm and a half.
Sugar, six drachms.
Distilled water, boiling, a pint.

Pour the water upon the rose petals, first pulled in pieces, in a glass or porcelain vessel (not glazed with lead, *E.*), then mix in the acid. Macerate for six hours, and strain the liquor; lastly, add the sugar to it.

ROSA GALLICA (Icosandria Polygynia; Rosaceæ, sub-ord. Roseæ).

Description.—The Rosa Gallica is the well-known cabbage rose, and is distinguished from the dog-rose (Rosa canina) by having a greater number of petals, and from the hundred-leaved rose (Rosa centifolia) by having a paler red colour.

Remarks.—The red rose (Rosa Gallica) petals contain tannin, which is dissolved by the hot water. The infusion is clear, and of a red colour, and has an agreeable acid flavour, dependent upon the dilute sulphuric acid. It is much used as a vehicle for the exhibition of disulphate of quinine. When this salt is added, the mixture immediately becomes cloudy, owing to the tannate of quinine which is formed and precipitated. The addition of a few drops of hydrochloric acid (gtt. iv to f℥j), renders it clear; but this infusion is a very improper vehicle for the administration of quinine, unless the prescriber wishes for the formation of the tannate. It has lately been asserted that tannate of quinine is more efficient than the more soluble sulphate itself. A much better solvent, and one which is clear, and has a beautiful colour, consists of dilute sulphuric acid, syrup of red poppy and water; and the omission of the roses does not occasion any diminution in the efficiency of the medicines.

Properties.—*Astringent* and *refrigerant.*

Uses.—Very commonly used, as above mentioned, as a vehicle for quinine. It is a pleasant refrigerant in *fever*, and is given in combination with a larger quantity of acid, or with neutral salines, as sulphate of magnesia, in *hæmorrhages.* It may be given in *colliquative sweats* and *diarrhœa,* either alone or combined with alum. It is *incompatible with salts of lead,* in consequence of the insoluble sulphate of lead which is formed by the sulphuric acid; but it is sometimes ignorantly prescribed, in conjunction with acetate of lead, to check hæmorrhages. The salts of iron deepen its colour, forming tannate of iron.

Dose.—f℥j to f℥ij, or more.

INFUSUM SENEGÆ, *E.*; INFUS. POLYGALÆ, *D.*

INFUSION OF POLYGALA OR SENEGA.

Take of Senega, ten drachms (℥ss, *D.*).
Boiling water, one pint (f℥ix, *D.*).
Infuse for four (one, *D.*) hours in a covered vessel, and strain.

Medicinal properties and uses.—This is used in the same cases and same doses as Decoctum Senegæ, which see, p. 279.

INFUSUM SENNÆ, *E.*

INFUSION OF SENNA (SENNA TEA).

Take of Senna, one ounce and a half.
Ginger, bruised, four scruples.
Boiling water, a pint.
Infuse an hour, and strain.

Medicinal properties and uses.—*Purgative.* This preparation is similar to the compound infusion of London and Dublin.

INFUSUM SENNÆ COMPOSITUM, *L. D. E.*

COMPOUND INFUSION OF SENNA.

Take of Senna, fifteen drachms (℥j, *D.*).
Ginger, bruised, four scruples (ʒj, *D.*).
Distilled water, boiling, a pint.
Macerate for an hour, in a vessel lightly covered, and strain.

E. Senna, ʒj, ʒij, or ʒiij; Tamarinds, ℥j; Coriander, bruised, ʒj; Brown sugar, ℥ss; Boiling water, f℥viii. Infuse for four hours, occasionally stirring. The tamarinds and coriander render this infusion less nauseous. In other respects it agrees with the London and Dublin compound infusion.

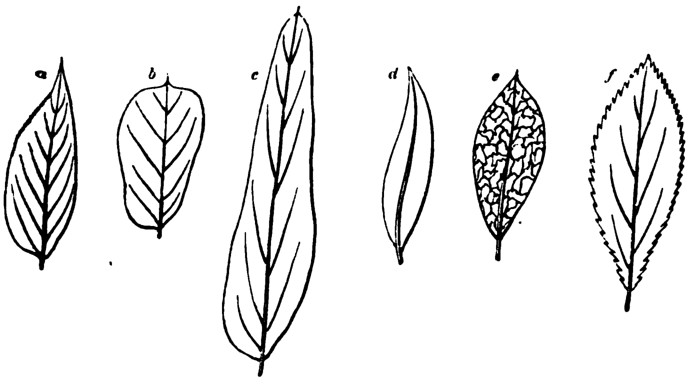
Remarks.—The ginger is added to prevent the griping which senna alone is liable to occasion. This infusion is generally combined with sulphate of magnesia, or potassio-tartrate of soda, to increase its purgative properties. When manna and tincture of senna are also added, it forms the ordinary "black draught."

Dose.—f℥ij to f℥iv, to be repeated according to circumstances.

CASSIA OFFICINALIS ET OBOVATA (Decandria Monogynia; Leguminosæ, sub-ord. Cæsalpineæ).

Description and varieties. — Three kinds of senna are principally used in England, viz. Alexandrian, East Indian, and Tinnevelly. The Alexandrian is sometimes considered the most valuable, but it is always mixed with argel leaves, whilst the Tinnevelly senna is generally unadulterated. There is a smaller and cheaper kind, called East Indian senna, which resembles the others in its properties.

Alexandrian senna. — Of this kind there are two forms, which are generally mixed together, — the Cassia acutifolia, *a*, and the Cassia obovata, *b*.



Senna leaves. Argel. Uva ursi. Buchu.

The distinguishing character of all senna leaves is, the *inequality of their sides at the base*, one of which is always round and the other acute. On the under surface of the leaf, the primary veins are prominent and run towards the midrib; and the ramifications of the veins may also be seen, if carefully examined. In the Argel leaf, *d*, which is the only common adulteration of the senna in the English market, the sides are acute, both at the apex and the base of the leaf; and the veins are either depressed, or cannot be distinguished, whilst the midrib is very prominent. The leaf itself has a greenish-white, cottony appearance, without, however, being actually downy.

The acute-leaved senna varies in length from three quarters of an inch to an inch; and the obovate senna is generally rather shorter. The leaves are frequently much broken.

Tinnevelly senna, *c*, agrees with the last in general characters. It is much larger, being from one to two inches in length. Its colour is more yellow than Alexandrian senna, and the leaves are seldom much broken.

East Indian senna is nearly the same size as Alexandrian, and is generally a good deal broken. It contains few admixtures of any other leaves.

Leaves for which senna may be mistaken. —Uva ursi, *e*, and buchu leaves (Barosma crenata), *f*. It is distinguished from both by its base. From the uva ursi it differs in its colour, and in the broadest part of the leaf being near the base, except in the obovate senna, which is not likely to be mistaken. From buchu it differs in having its margin perfectly even, whilst the margin of the buchu is minutely serrated.

General medicinal properties — *Purgative*. The different kinds of senna are of nearly equal medicinal value. The argel leaves are said to be even more active than senna itself; but they cause much griping. (The obtuse-leaved senna is not above half as powerful as the acute Alexandrian, or Tinnevelly senna. *Christison.*)

Characteristic effects. — Safe and certain purgative, not being poisonous in an overdose. Its operation is irritant, and causes griping and increased frequency of the pulse. Hence it is generally combined with some neutral salt, and an aromatic. It acts upon the pelvic viscera, and is not so liable to be followed by constipation as many other purgatives. When used habitually, the dose, in many cases, admits of being reduced, instead of requiring to be increased. The milk of nurses who are taking senna becomes purgative.

Composition. — Senna contains an uncrystallisable, bitter principle, cathartine; volatile oil; and a peculiar inert extractive matter, which, according to Bouillon la Grange, is converted into an active resin, by combining with oxygen at a boiling temperature. According to him, therefore, a cold infusion of senna is not so good as one made by boiling water.* According to Mr. Battley, however, a cold infusion contains as much of the resinous and other active principles as one made by heat.†

Uses. — As a general and efficient laxative or cathartic in occasional or *habitual constipation*.

Dose. — Of the leaves, ʒss to ℥ss, taken as an infusion; of the fusion, f℥ss to f℥ij or more.

INFUSUM SERPENTARIÆ, *L. E.*

INFUSION OF SERPENTARY.

Take of Serpentary, half an ounce.
Distilled water, a pint.

Macerate for four hours, in a vessel lightly covered, and strain.

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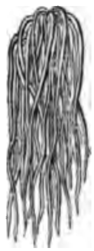
* Pereira, Mat. Med. (2d ed.), p. 1605.

† Lancet, 1837-38, vol. ii. p. 266.

ARISTOLOCHIA SERPENTARIA (Gynandria Hexandria; Aristolochiaceæ).

Description.—Serpentaria root consists of a bundle (twenty or thirty) of fine root fibres, connected together, having a light-brown, or grey colour, and a peculiar, slightly aromatic odour, and a very *dry* appearance.



Roots for which it may be mistaken.—Valerian. This consists of thicker fibres, which are less numerous and entangled than those of serpentary. The colour is more of a yellow-brown, and the root does not look so dry. The odour at once distinguishes them. Instead of being aromatic, valerian is remarkably disagreeable, resembling the urine of cats.

Composition.—Volatile oil; bitter principle (extractive); no tannin.

Medicinal properties.—*Stimulant; tonic.*

Characteristic properties.—It is *diaphoretic*, and generally *slightly laxative*, along with its stimulant properties. It promotes the appetite, and quickens the pulse. It may be given in combination with the salts of iron. In large doses it causes nausea and headache.

Uses.—It is a valuable remedy in the *low stage of typhus*, and is extensively used in this disease at Guy's Hospital. It is generally combined with sesquicarbonate of ammonia, and is given when the tongue is dry and brown, or black, and the pulse low. Its diaphoretic action is beneficial in this stage. It is seldom used as a general tonic.

Dose.—Of the infusion, f℥j to f℥jss, several times daily.

INFUSUM SIMARUBÆ, *D.E.*

INFUSION OF SIMARUBA.

Take of Simaruba root bark, bruised, four (*D.*), three (*E.*), drachms.
Distilled water, boiling, a pint (*E.*), eighteen fluid ounces (*D*).

Macerate for one (*D.*), two (*E.*), hours, in a vessel lightly covered, and strain.

SIMARUBA OFFICINALIS (Decandria Monogynia; Simarubiaceæ).

Description.—Simaruba bark is very fibrous in its structure, and the pieces are generally torn and split longitudinally, so as to give it a *ragged appearance.* Its colour is yellow internally, and a *dirty* yellowish-brown *externally.* Its surface is rough and warty.

Composition.—Quassite (peculiar bitter principle); volatile oil; and resin.

Medicinal properties.—Bitter tonic.

Characteristic properties.—In large doses it acts as an *emetic*, and is sometimes classed as an emetic. It is *diaphoretic*, and allays the griping of tenesmus; restores tone to the mucous membrane of the bowels, and force and frequency to the pulse, when sinking from disease of the mucous membrane of the large intestines.

Uses.—Almost confined to the treatment of *dysentery*. It is not adapted to the early stage of the disease; but when the acute inflammatory symptoms have been subdued, and the patient's powers are beginning to sink, it is very useful when combined with opium. It is not used as a tonic in the general class of cases requiring bitters; and upon the whole, is not much employed.

Dose.—Of the infusion, f℥j to f℥ij.

INFUSUM VALERIANÆ, *L.D.*

INFUSION OF VALERIAN.

Take of Valerian, half an ounce.
Distilled Water, boiling, a pint.

Macerate for half an hour, in a vessel lightly covered, and strain.

Medicinal properties and uses.—See TINCTURA VALERIANÆ COMPOSITA. The infusion is a convenient form for the administration of valerian, being less liable to disorder the stomach than the powdered root. It is not so good as the ammoniated tincture, and is seldom used.

Dose.—f℥j to f℥ij.

LINIMENTA.

LINIMENTS.

LINIMENTUM ÆRUGINIS, *L.*

LINIMENT OF VERDIGRIS.

Synonyme. Unguentum Ægyptiacum. Mel Ægyptiacum. Oxymel Æruginis. Linimentum Æruginis.

Take of Verdigris, powdered, an ounce.
Vinegar, seven fluid ounces.
Honey (despumated), fourteen ounces.

Dissolve the verdigris in the vinegar, and strain through a linen cloth; afterwards, the honey being poured in, boil down to a proper consistence.

Remarks.—Verdigris is an impure compound of copper and acetic acid.

Process of manufacture.—It is made at Montpellier by steeping plates of copper in jars containing the refuse of the grapes after the manufacture of wine. Fermentation continues in this mass and forms vinegar, which, in conjunction with air and moisture, acts upon the copper and forms the compound termed verdigris. It is made in England by placing alternate plates of copper, and cloths soaked in pyroligneous acid.

Properties.—The compound formed by these different methods differs somewhat in appearance. The French is in shapeless masses, of a bright green colour; the English is more blue, and has some degree of translucency. Both kinds are entirely soluble in acetic, sulphuric, or hydrochloric acid: whatever is not dissolved is an impurity. Distilled water dissolves 56 per cent., and leaves 44 per cent. as a fine green powder.

Composition.—Verdigris, though termed diacetate of copper, is not uniform in its composition, as it contains variable proportions of acid and base. According to Mr. Phillips, it usually consists of

2 eq. oxide of copper; 1 eq. of acetic acid; 6 eq. of water, $2CuO,\bar{A},6HO$.
Water converts this into a neutral soluble acetate, $CuO,\bar{A}$.
And an insoluble triacetate, $3CuO,\bar{A}$.

Tests.—It is partly dissolved by water, and almost entirely by dilute sulphuric (muriatic, *E.*) acid, with the aid of heat: nothing is thrown down from this solution, when ammonia is added in excess.

Adulterations.—Verdigris is not intentionally adulterated; but it is generally mixed with sand, and the husks and stalks of grapes derived during its manufacture.

Medicinal properties.—*Detergent* and *escharotic. Emetic* and *tonic.*

Uses.—Verdigris has been employed as a tonic in *epilepsy*, and as an emetic; but its effects are so violent and uncertain, that it is never now used internally. The liniment is applied as a local stimulant to indolent ulcers. It is sometimes applied, by means of a camel's-hair pencil, to *venereal ulcers in the throat;* and when diluted with water, it is used as a *gargle;* but its place might be supplied by many more efficient, and equally convenient, remedies.

LINIMENTUM AMMONIÆ, *L.D.E.*

LINIMENT OF AMMONIA.

Take of (Weaker) solution of ammonia, sp. gr. ·960, a fluid ounce.
Olive oil, two fluid ounces.
Shake them together until they are mixed.

D. Solution of ammonia, sp. gr. ·950, f ℥j; Olive oil, f ℥iij. Mix.

Remarks.—A white fluid soap is formed in this case by the union of the alkali with the oil, and is kept fluid by the water of the solution of ammonia. It is an excellent stimulant application to the throat externally in cynanche tonsillaris; and if a little extract of belladonna is previously combined with it, it forms a very useful *rubefacient* and *anodyne* liniment for the joints in *chronic rheumatism.* For common use, the proportion of ammonia is rather too large; one part to three of oil is a more convenient formula.

LINIMENTUM AMMONIÆ COMPOSITUM, *E.*

Take of Stronger aqua ammoniæ, sp. gr. ·880, five fluid ounces.
Tincture of camphor, two fluid ounces.
Spirit of rosemary, one fluid ounce.
Mix them well together.

This embrocation is more stimulating than the last. In most instances it would produce considerable pain, and raise a blister.

LINIMENTUM AMMONIÆ SESQUICARBONATIS, *L.*

LINIMENT OF SESQUICARBONATE OF AMMONIA.

Synonyme. Linimentum Volatile.

Take of Solution of sesquicarbonate of ammonia, a fluid ounce.
Olive oil, three fluid ounces.
Shake them together until they are mixed.

Remarks.—The carbonic acid in this liniment prevents the formation of so perfect a soap as in the last, and it sooner separates from the water. It is not so strong or useful as the last, but is employed in the same cases.

LINIMENTUM ANODYNUM, *D.* See LIN. OPII, p. 372.

LINIMENTUM CALCIS, *L.D.E.*

LINIMENT OF LIME (WATER).

Take of Lime water,
Olive oil (linseed oil, *E.*), of each, ten fluid ounces.
Shake them together until they are mixed.

Properties and uses.—This has long been a popular application to burns and scalds, and is also used by many surgeons. The objections to its employment are, that it is a greasy, dirty application, and that, whilst employing it, the patient is exposed to continued cold, which in many instances causes great suffering.

LINIMENTUM CAMPHORÆ, *L.D.E.*

CAMPHOR LINIMENT.

Synonyme. Camphorated oil.

Take of Camphor, an ounce.
Olive oil, four fluid ounces.
Dissolve (the camphor in the oil with a gentle heat, *D.*; rub them together in a mortar till the camphor is dissolved, *E.*).

Remarks. — The camphor readily *dissolves* in the oil, and forms a clear solution, which is employed as a *stimulant* embrocation to *sprains and bruises, and in rheumatism.*

LINIMENTUM CAMPHORÆ COMPOSITUM, *L.D.*

COMPOUND LINIMENT OF CAMPHOR.

Take of Camphor, two ounces and a half.
Stronger solution of ammonia, three fluid ounces (f℥v, *D.*).
Rectified spirit, seventeen fluid ounces (f℥xv, *D.*).
Oil of lavender, a fluid drachm.

Dissolve the camphor and oil in the spirit; then add the ammonia, and shake them together until they are mixed.

Remarks. — The directions for this preparation are considerably changed from those of the last Pharmacopœia. The strong solution of ammonia is substituted for the weak, but the quantity is reduced, though not in equal proportions: the present liniment is, therefore, rather stronger than the old one. In the last Pharmacopœia, the liniment was ordered to be distilled, which is dispensed with in the present one, as being a perfectly unnecessary trouble and expense, unattended by any benefit.

Medicinal properties and uses. — This is used for the same purposes as the former, but is much more powerful on account of the ammonia which it contains. It is a good vehicle for the introduction of opium into the system, by means of friction. An embrocation composed of f℥jss of this liniment, and f℥ss of laudanum, made warm and rubbed over the abdomen, quickly allays the pains of flatulent colic (*Dr. A. T. Thomson*).

LINIMENTUM CANTHARIDIS, *D.*

LINIMENT OF CANTHARIDES.

Take of Spanish flies, in fine powder, three ounces.
Olive oil, twelve fluid ounces.

Digest the flies in the oil for three hours in a steam or water bath, and strain through flannel; express the residuum, and strain the oil thus obtained; finally, mix both products.

Medicinal properties and uses.—This is a stimulating embrocation, which may be used for rheumatic pains in the joints and elsewhere.

LINIMENTUM CROTONIS, *D.*

CROTON OIL LINIMENT.

Take of Croton oil, one part.
Oil of turpentine, seven parts.
Mix them with agitation.

Medicinal properties and uses. — This is a valuable preparation, and might have been introduced with advantage into the London Pharmacopœia. It is used when it is desirable to produce speedy and permanent revulsion to the skin, as in congestion of the lungs, or in the later stages of inflammation of that organ; or in water on the brain when we wish to act upon the scalp without using a blister. This liniment, when rubbed upon the skin, produces innumerable minute pustules, which speedily coalesce and enlarge, and at length become extremely sore. A single application is sometimes sufficient, but it more frequently happens that it must be used three or four times before the eruption appears. After it is produced, the suffering of the patient will limit the frequency of its employment. The nurse should be told carefully to avoid holding the face over the part whilst rubbing it, as I have seen severe erysipelas of the face produced by the acrid vapour arising during the friction. It should not be rubbed on with the naked hand, but by means of a cloth.

LINIMENTUM HYDRARGYRI, *L.* (COMPOSITUM, *D.*).

(COMPOUND, *D.*) LINIMENT OF MERCURY.

Synonyme. Linimentum Hydrargyri Comp. *Ph. L.* 1836.

Take of Ointment of mercury,
Lard, each, four ounces.
Camphor, an ounce.
Rectified spirit, a fluid drachm.
Solution of ammonia, four fluid ounces.

Rub the camphor, first with the spirit, then with the lard and ointment; lastly, the ammonia being gradually poured in, mix them all.

D. Mercurial ointment, ℥j; Camphor liniment, Solution of ammonia (not fortis), of each, f℥j. Melt the ointments in the liniment with a gentle heat, then add the ammonia, and mix them with agitation.

Medicinal properties and uses. — This liniment is *stimulant* and *discutient*. It is said to salivate sooner than mercurial ointment, when freely employed. It is used to remove *chronic venereal pains*, *nodes*, *indolent enlarged glands*, and some non-purulent collections of fluid, as fluid nodes. I am in the habit of employing a similar liniment of about half the strength, as a friction over the tumid abdomen of children suffering from marasmus, with enormous bellies, wasted extremities, greedy appetites, and clay-coloured or offensive motions. It frequently produces marked benefit.

One drachm of the lin. hydrarg. contains gr. x of mercury.

LINIMENTUM OPII, *L. D. E.*

LINIMENT OF OPIUM.

Take of Soap liniment, six fluid ounces.
Tincture of opium, two fluid ounces (f℥vi, *D.*).

E. Take of Castile soap, ℥vi; Opium, ℥jss; Camphor, ℨiij; Oil of rosemary, fℨvi; Rectified spirit, Oij. Macerate the soap and opium in the spirit for three days; filter; add the oil and camphor, and agitate briskly.

Remarks. — The Dublin liniment contains three times as much laudanum as the London one, and is altogether different in its smell, from the absence of any rosemary, the Dublin soap liniment not containing any.

Medicinal properties and uses. — This is a useful sedative liniment, and may be employed when the internal use of opium cannot be borne. It is also a good application, in the way of friction, in chronic affections of the joints, remaining after sprains, &c.; when there is pain, and *tenderness*, with some degree of stiffness, but not evidence of active inflammation, or of ulceration of cartilage. In these cases, the pain is often not a symptom of active mischief, and is rather aggravated than benefited by active treatment. The addition of compound camphor liniment is often an improvement.

LINIMENTUM SAPONIS, *L. D. E.*

SOAP LINIMENT.

Synonyme. Opodeldoc.

Take of Soap, two ounces and a half.
Camphor, ten drachms.
Spirit of rosemary, eighteen fluid ounces.
Distilled water, two fluid ounces.

Mix the water with the spirit; then add the soap and camphor, and macerate, frequently stirring, until they are dissolved.

D. Castile soap, powdered, ℥ij; Camphor, ℥j; Proof spirit, f℥xvi. Dissolve the soap in the spirit with a gentle heat, and then add the camphor, or allow them to stand for some time together.

E. Castile soap, ℥v; Camphor, ℥ijss; Volatile oil of rosemary, fʒvi; Rectified spirit, Oij. Digest the soap in the spirit for three days; add the camphor and oil, and agitate briskly.

Remarks.—This preparation has been beneficially altered in the present Pharmacopœia by the reduction of the quantity of soap. In the last it was so great, that the spirit could not dissolve the whole of it. The Dublin liniment differs materially in smell from the London and Edinburgh, owing to the absence of any rosemary. The London and Edinburgh preparations are of equal strength, and closely correspond with each other.

Medicinal properties and uses.—This is a slightly *stimulant* application; it is less powerful than the linimentum camphoræ compositum, but is used for similar purposes.

Officinal preparation.—Linimentum Opii.

LINIMENTUM SIMPLEX, *E.*

SIMPLE LINIMENT.

Olive oil, four parts; white wax, one part. Melt together, and shake well as they cool.

Medicinal properties and uses.—An excellent placebo, when the friction is the most important part of the treatment.

LINIMENTUM TEREBINTHINÆ, *L. D. E.*

LINIMENT OF TURPENTINE.

Synonyme. Linimentum Terebinthinatum, *E.*

Take of Soft soap, two ounces.
Camphor, an ounce.
Oil of turpentine, sixteen fluid ounces.
Shake them together until they are mixed.

D. Oil of turpentine, f℥v; Resin ointment, ℥viii.

E. Camphor, ℥ss; Resin ointment, ℥iv; Oil of turpentine, f℥v.

Medicinal properties and uses.—This is a *more powerfully stimulant* application than the preceding, and was introduced by *Mr. Kentish*, as a *dressing* for *burns*. The burnt surface is first bathed, for a few minutes, with warm oil of turpentine, and is then covered with pledgets of tow or lint, thickly spread with this liniment, mixed with resin cerate. It is a useful stimulating liniment in other cases requiring local stimulus.

MELLITA.

PREPARATIONS OF HONEY.

Remarks. — *Honey* is a peculiar secretion by the nectariferous glands of flowers, from which it is extracted by bees. It is carried into the "crop," which is a dilated portion of the œsophagus; but does not appear to pass so far as the stomach, for it has never been found there. When disgorged by the bees, it forms common honey.

Varieties. — *Virgin* honey is the first crop produced by a swarm of bees, and is considered to be the best. *Narbonne* honey is common honey which has derived a peculiar flavour from the flowers upon which the bees feed. Rosemary is sometimes added to honey to give it this flavour. *Comb* honey is honey still contained in the cell; and *run* honey is obtained by allowing it to drop or run from the everted comb.

Composition. — Chiefly two kinds of sugar; one of which is crystallisable, and the other is not. When fermented, it yields a liquor termed "mead." It is sometimes adulterated with starch or flour, which may be discovered by boiling the honey in water, and when cold, adding iodine. If either is present, a blue colour will be produced, which is not the case when the honey is pure. It has lately been adulterated with sugar obtained from starch. If pure honey is boiled with the blue hydrated oxide of copper, precipitated by *liq. potassæ*, and rendered *slightly* alkaline, the oxide does not change its colour. If starch sugar is present, even in small proportion, the blue oxide is converted into the red dinoxide, which imparts a reddish-brown colour to the sediment, when the mixture is at rest. Several minutes' boiling is requisite to produce the full effect (*Ure's modification of Trommer's test*).

Properties. — *Emollient*; *demulcent*; *nutritious*; and *laxative.* It is liable to cause griping, if used in large quantities.

Uses.—Honey is employed as an emollient, as well as in *gargles*; and is a useful *vehicle* for the *application* of more powerful remedies to the *mouth* and *throats of children.* Mixed with barley water and lemon juice, it forms a favourite drink for allaying tickling coughs. It is sometimes spread upon boils to promote their suppuration.

MEL DEPURATUM-DESPUMATUM.

CLARIFIED (DESPUMATED) HONEY.

Melt the honey in a water-bath, and strain it, while hot, through flannel.

Remarks.— By this process, any wax accidentally remaining, or sand, or other impurities, are removed.

Test.—If it is dissolved in water at a heat of about 170°, and when cold, mixed with iodide of potassium and dilute sulphuric acid, it does not exhibit any blue colour.

MEL BORACIS, *L. D. E.*

HONEY OF BORAX.

Take of Borax, powdered, a drachm.
Honey (despumated), an ounce.
Mix (by trituration, *D.*).

Medicinal properties and uses.— *Detergent* and *cooling* in aphthous affections of the tongue and fauces.

BORAX, SODÆ BIBORAS (BIBORATE OF SODA).

Synonyme. Sub-borate of Soda.

Description.—This salt is in irregular translucent masses, which, if regularly crystallised, would be oblique rhombic prisms. They are colourless, readily soluble in hot or cold water, fuse in their own water of crystallisation, when heated, and when dissolved in spirit, with the addition of a little sulphuric acid, and set on fire, impart a peculiar green colour to the flame. Borax effloresces very slowly and slightly in the air. The aqueous solution changes turmeric paper brown, like an alkali. It is, however, considered to be really an acid salt, and to consist of

1 eq. of soda; 2 eqs. of boracic acid; and 10 eqs. of water;
$NaO, 2 BO^3, 10 HO$.

There is, however, a difference of opinion about the equivalent of boron, which occasions a difference in the statements as to the constitution of borax.

Medicinal properties and uses.—The taste of borax is saline, cooling, and slightly alkaline. When applied in solution to open sores, it causes smarting. When swallowed in a large dose, it occasions vomiting, and is thought also to cause contraction of the uterus, and expulsion of the fœtus. It is seldom used internally, but is recommended by Dr. Copland as an addition to secale, for exciting the failing action of the uterus.* As he always gives it in conjunction with secale, it is not easy to judge how much of the effect is due to it, and how much to that drug. Mr. Audland, of Abbey Tintern, tells me that he has observed better effects in amenorrhœa, from the aloes and myrrh pill combined with three grain doses of borax than from the pill alone. It is, however, chiefly employed, topically, in the form of lotion or combined with honey, for the cure of *thrush* in *children*, to *check excessive mercurial salivation*, and to cure some cutaneous diseases, as *pityriasis* and *ringworm*. It is sometimes employed in the form of ointment to *piles*.

Dose and administration.—To promote uterine contractions, gr. x to gr. xxx. As an emmenagogue, gr. viii, three or four times daily. A solution of ℥j to f℥v of water, with a little honey, is a good gargle in the early stages of salivation; and ℥j in f℥ij of vinegar has often cured obstinate ringworm (*Abercrombie* and *Christison*).

MEL ROSÆ, *L. E.*

HONEY OF ROSE.

Take of Red rose (petals) dried, four ounces.
Water, boiling, twenty-four ounces (two pints and a half, *E.*).
Honey (despumated), five pounds.

Macerate the rose petals, first pulled in pieces, in sixteen fluid ounces of the water for two hours; then press them gently with the hand, and strain. Macerate again, for a short time, what is left in the remainder of the water, and pour off the liquid. To this add half the first infusion, and set half aside. Then add the mixed liquors to the honey, and evaporate in a water-bath, so that the liquid which was set aside, being mixed, it may be of a proper thickness.

Medicinal uses.—An agreeable addition to detergent and astringent gargles, &c.

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* Dict. of Pract. Med. pp. 11. and 115.

OXYMEL, *L.D.*

OXYMEL.

Synonyme. Oxymel Simplex.

Take of Honey (despumated), five pounds.
Acetic acid, seven fluid ounces.
Distilled water, eight fluid ounces.

Mix the acid, added to the water, with the honey made hot.

D. Honey, ℔j; Acetic acid of commerce, sp. gr. 1044, ℥iij.

Medicinal properties and uses. — *Detergent;* principally used as the basis of gargles and expectorant remedies. Dissolved in barley water, it forms a pleasant cooling drink in fevers and inflammatory affections; but it is liable to cause griping in some persons.

Dose. — fʒj to fʒij.

OXYMEL SCILLÆ, *L.*

OXYMEL OF SQUILL.

Take of Honey (despumated), five pounds.
Vinegar of squill, two pints and a half.

Boil down the vinegar, with a slow fire, to twelve fluid ounces, and mix it with the honey made hot.

SQUILL, SCILLA MARITIMA (Hexandria Monogynia; Liliaceæ).

Description.—The fresh bulb is large and varies in weight from half a pound to four pounds; but is cut into slices, previous to being dried. These are white, or pale yellowish-white, thin, and twisted. When perfectly dry, they are brittle, but they quickly absorb moisture from the air, and become soft and tough. When dry they can be easily powdered, but unless the powder is kept in very well stopped bottles, it soon becomes moist, and forms a hard mass. Before weighing squill for making any of the preparations, the slices ought to be freshly dried.

Composition. — *Scillitina,* which is a bitter crystallisable principle; and a variety of apparently unimportant constituents. It yields its active principles to water, acetic acid, and proof spirit. It contains gum, which renders the acetum scillæ liable to spoil, and attracts moisture rapidly from the air, occasioning the squill, whether in powder or in slices, to become soft and damp so quickly.

Medicinal properties. — *Diuretic; expectorant; emetic;* and *purgative.* When taken even in small doses, it frequently causes nausea, and some degree of purging. It acts *more beneficially* in *anasarca* than in ascites, or other local dropsy. It is considered *objectionable* in dropsy dependent upon *diseased kidney*, or where *inflammation* is present. Its *diuretic effects are much increased by combination with mercury* or with digitalis. It is often considered to be a *stimulant* expectorant, and unsuited to the early stages of bronchitis or catarrh; but Christison affirms this to be quite a mistake. It is not, indeed, easy to see in what way a medicine which reduces the pulse, and very commonly causes nausea, if not vomiting, is a stimulant. It increases the secretion from the bronchial mucous membrane, but its expectorant properties are rather uncertain. As an emetic, its operation is so uncertain and violent, that it is seldom used; but Thomson says, that when it acts gently, it is the best emetic that can be employed in hooping cough. It is never employed as a purgative. It is *not* so well adapted as the more stimulating balsams to the *chronic bronchitis* of old persons, or those whose *strength* is *much depressed.*

Characteristics.— As a *diuretic*, squill is nauseant, but very efficient. As an *expectorant*, it is rather uncertain, and depresses the pulse; but its purgative properties allow it to be combined with opium, without causing constipation. As an *emetic*, it is very uncertain; sometimes acting violently; at other times, not acting at all. As a *cathartic*, it is very uncertain and violent; and, therefore, is not used with this intention.

Medicinal uses.— In *anasarca*, especially in leucophlegmatic habits, or dependent upon heart disease or bronchitis (combined with mercury or digitalis). In *chronic bronchitis* and common coughs (combined with opium or compound tincture of camphor). In *hooping cough*, as an emetic, and sometimes also in *croup.*

Dose and administration. — In dropsy, the solid squill is to be preferred. Dose, gr. ij, night and morning, or oftener, in combination, as above mentioned, and increased till some degree of nausea is produced, or until the dose is raised to gr. iij or gr. iv.

The oxymel is a very common and convenient form, and is often combined with opium, or compound tincture of camphor. It is chiefly used as an expectorant, and not as a diuretic.

When troublesome nausea, vomiting, or purging is caused by squill, opium is the best remedy.

Dose of oxymel scillæ, f℥ss to f℥j.

METALLICA.

METALLIC PREPARATIONS.

ON SALTS.

Before entering upon the metals, individually, it may be well to premise a few remarks upon salts generally.

Definition. — When first used in chemistry, the term *salt* was confined to the class of compounds resulting from the union of an acid with an alkali, which were designated as oxy-salts; but it was soon found necessary to extend its application to compounds, such as common salt (chloride of sodium), which consist of a metal united with the electro-negative bodies, chlorine, iodine, bromine, and fluorine, which were distinguished as "haloid salts," from the similarity of their constitution to that of sea salt, "'Αλς." The analogous compounds of sulphur with metallic bases have been added to the list as "sulphur salts;" and, recently, the term has been applied to bodies formed by the union of certain compounds, termed "*radicals*," with metallic bases, or even with hydrogen.

Instances of each of these classes of salts will be found amongst the metallic preparations in the Pharmacopœia. I shall not, however, consider the hydrogen compounds, last mentioned, as being salts; but shall speak of them as hydrogen acids, in which light they are still usually regarded.

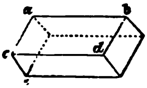
Some chemists now speak of water as a base, and the phrase "sulphate of water," or the symbol HO, SO^3, is employed to indicate a compound of water with an acid, analogous to one consisting of an ordinary base with an acid. Thus the salt commonly known as bisulphate of potash, $KO + 2\ SO^3 + HO$, is sometimes described as sulphate of potash, KO, SO^3 + sulphate of water, HO, SO^3.

The greatest number of medicinal salts consist of an acid, combined with a metallic oxide as a base; and the general remarks which may be made upon these, are more or less applicable to all the other classes of saline compounds.

General properties of salts. — Salts may be *neutral*, *i. e.* have no effect upon test papers, and have neither an acid nor an alkaline taste; or they may be *acid*, *i. e.* redden litmus paper, and possess a sour taste; or *alkaline*, *i. e.* render turmeric paper brown, and possess an alkaline flavour. They are termed *basic* when there is more than one equivalent of base to one equivalent of acid: thus, disulphate of quinine is a *basic* salt, containing 2 eqs. of quinine to 1 eq. of sulphuric acid.

Crystals. — When carefully prepared they frequently assume certain regular forms, which are termed crystals. Of these there are an immense number; but it has been found that they may all be reduced to a few "primary forms" by splitting or "cleaving," them in certain directions.

Cleavage. — If a salt is taken, and an attempt made to split it in pieces, it will be found to admit of being divided in certain directions; and the portions separated, as well as those which remain, will have the smooth polished surface which characterises crystals. If the attempt be made to split it in other directions, it will be found impracticable; or if the force used be sufficiently great, the salt will be broken or cut, but not split. These statements are very easily verified by taking a plate of micaceous sulphate of lime, and a crystal or irregular mass of Iceland spar (carbonate of lime). The former can be split, with the utmost ease, into extremely thin layers, by cutting the edge parallel with the extended smooth surface of the crystal; but it will be found impossible to divide it into any regular shape, by cutting it perpendicular to its flat surface. It is quite different with the Iceland spar. If the edge of a knife is laid upon it, parallel with any of its smooth sides, or coinciding with one of the lines which may be seen to traverse its structure, and a smart blow is given to the back of the knife, it will split, at once, into portions having the shape here represented; and no difficulty will be found in cleaving it again into as many pieces as may be desired, by placing the edge of the knife parallel with *a b*, *a c*, or *b d*, and the pieces will all have the same form as the original crystal. But it will be found impossible to split it in the direction of *a d*, or *b c*. When the cleavage has been carried to such an extent, that the faces obtained by cleaving in different directions meet each other, the crystal is said to have been reduced to its "primary form."



Primary forms. — The primary forms are frequently only obtained by the process of cleavage, and the crystals to which they belong may only be found in what is termed a "secondary form;" as may be illustrated by the accompanying figures.

Fig. 1.

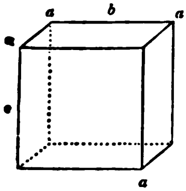


Fig. 2.

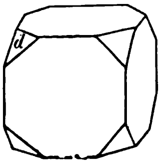


Fig. 3.

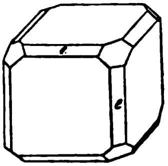


Fig. 4.

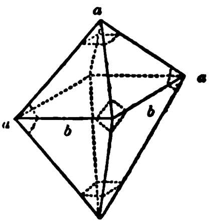


Fig. 1. represents a cubical crystal, which is one of the primary forms. The crystal may, however, be without the solid angles *a*, *a*; and these may be replaced by planes, as *d*, in *fig.* 2. In *fig.* 3. the form is still further modified by the loss of the edges *b* and *c*, and the consequent appearance of the planes, *e*. By continuing to remove slices parallel with *d*, *fig.* 2., we shall at length arrive at the octahedron, *fig.* 4.; and it will be seen how much the appearance of this figure would be altered, if the solid angles, *a a*, were removed as indicated in the drawing. If, on the other hand, *fig.* 2.

were repeatedly cut, parallel to *a a*, *fig.* 1., the planes *d* would gradually disappear, and the cube would be restored. This would also happen, if the angles *a a*, and the sides *b b* of *fig.* 4., were removed in a similar way. Thus, a crystal may assume a great number of forms, each differing from the other; and they may still be all referable to one primary form, which is some regular geometric figure. This variety is so great, that between 100 and 200 different secondary forms of carbonate of lime alone are known to mineralogists.

The primary forms which most frequently occur amongst the pharmacopœial metallic preparations, are the cube; the regular octahedron; the square prism; the right rhombic prism; and the hexagonal prism.

The cube (*fig.* 1.) has all its sides equal, and all its angles right angles. It is bounded by six equal square faces.

The regular octahedron (*fig.* 4.) is bounded by eight equilateral triangles; the base, *b b*, is a square.

The square prism (*fig.* 5.) is a six-sided figure, which differs from the cube in its faces *a*, *a*, being rectangular instead of square. Its ends *c*, *c*, are square.

The right rhombic prism (*fig.* 6.) has the terminal planes, *a*, rhombs, the other sides, *c*, *c*, are at right angles with these.

The hexagonal prism (*fig.* 7.) is bounded by eight sides, six of which, *b*, *b*, are parallelograms; and the two terminal ones, *a a*, hexagons. The planes *b*, *b*, may be either longer or shorter than those represented, without altering the character of the figure.

The octahedron, with a rhombic base, differs from *fig.* 4. in having the base, *b b*, a rhomb, instead of a square.

The oblique rhombic prism differs from *fig.* 6. in the sides, *c c*, being oblique to its planes, *a*, instead of at right angles with them.

Fig. 5.

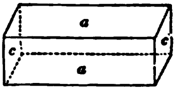


Fig. 6.

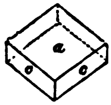
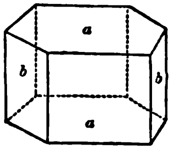


Fig. 7.



Water of crystallisation.— Many salts are capable of being dissolved in water, and of assuming a crystalline form, when the solution is slowly and quietly evaporated. As they solidify, a portion of the water combines with them, and becomes solid also, and is termed the water of crystallisation, because its presence is necessary to the formation and characters of the crystal. If this water is separated, the crystal loses its regular form, and becomes a shapeless mass. In some instances, the transparency or colour, as well as the form, is dependent upon the water of crystallisation. These circumstances may be easily seen by heating a fine crystal of alum until the water is expelled. Some crystals do not contain any water, and are termed, *anhydrous*, of which nitrate of silver is a good example.

Efflorescence.—Some crystals, when exposed to the air, gradually lose their water of crystallisation, become shapeless and powdery, and are said to *effloresce*, *e. g.* carbonate of soda.

Deliquescence.—Other salts, on the contrary, absorb moisture from the air, and either become moist, or are actually dissolved in the water thus obtained, and are said to *deliquesce*, *e. g.* carbonate, and acetate of potash.

Constitution.—Two theories, at present, divide the opinions of chemists as to the constitution of the oxy-salts: but before entering upon them, it will be better to consider the nature of the haloid salts.

When hydrochloric acid comes in contact with a metallic oxide, such as soda, both bodies are decomposed, and two new compounds are formed, which do not contain either hydrochloric acid or soda. The chlorine of the acid combines with the sodium of the base, and forms chloride of sodium, whilst its hydrogen combines with the oxygen of the soda to form water. Similar changes take place, when hydrosulphuric acid (sulphuretted hydrogen) comes in contact with a metallic oxide, *e. g.* oxide of lead. The sulphur and the lead form sulphuret of lead; and the hydrogen and oxygen form water.

Neither chlorine nor sulphur possesses acid properties until it is combined with hydrogen; which thus assumes the character of an acidifying principle.

According to the old, and still generally retained theory of the oxy-salts, their constitution is essentially different from the above. It is supposed that in the case of sulphate of soda, for example, two compounds unite to form a third; that the sulphuric acid (sulphur and oxygen) combines with the soda (sodium and oxygen) to form sulphate of soda: thus represented, $NaO+SO^3$.

Binary theory.—According to the new, which is designated as the binary theory, the same elements enter into the compound, but they are arranged very differently. It is supposed that a new compound or "radical" is formed, termed "*sulphatoxygen;*" which consists of sulphur, with four equivalents of oxygen, SO^4, and that it then combines with the metal sodium. The compound thus formed is named "Sulphatoxide of sodium," $Na+SO^4$. On a similar principle, nitrate of potash is supposed to be formed of a "radical," *nitratoxygen*, NO^6 and potassium.

Old theory,	Nitrate of potash,	$KO+NO^5$.
Binary theory,	Nitratoxide of potassium,	$K+NO^6$.

Several reasons are adduced in favour of this new theory, of which the following are the most important.

1st. It is contrary to analogy to suppose that bodies which resemble each other so closely as sulphate of soda and chloride of sodium, should be so differently constituted as is the case, according to the present views of chemists.

2nd. The presence of water, or some compound of hydrogen, appears to be essentially necessary to the development of acid properties in the oxygen acids. Thus, anhydrous sulphuric acid does not possess acid properties. It does not redden litmus paper, and has little disposition to unite with bases: as soda or potash. Anhydrous carbonic acid is equally destitute of acid properties. Some acids are not known to exist, unless in combination with water or a base. It is therefore considered probable that, in these cases, the hydrogen is really the acidifying principle, as in the case of hydrochloric acid. When water is added to an oxy-acid, the oxygen is supposed to combine with the so-called acid to form the new "radical," and the hydrogen, combining with this, forms the real acid. Thus, hydrated sulphuric acid would be styled, according to these two theories,

Old, Hydrated sulphuric acid, SO^3+HO.
New, Sulphatoxide of hydrogen, SO^4+H.

When a base is combined with this, the hydrogen of the acid will combine with the oxygen of the base to form water, and the radical will combine with the metal.

3rd. This view is analogous to the one usually received respecting some compounds, of which cyanogen, NC^2, is the most important. This radical combines with hydrogen and forms an acid, hydrocyanic acid, HCy, or HNC^2, which again acts upon bases in a manner precisely similar to hydrochloric acid: thus,

$KO+HCy$, potash and hydrocyanic acid $=KCy+HO$, cyanide of potassium and water.

4th. It accounts for a remarkable law in chemistry, "that the number of equivalents of acid in a salt, is always equal to the number of equivalents of oxygen in the base." For example,

Sulphate of oxide of mercury,	$HgO+SO^3$	or $Hg+SO^4$
Bisulphate of binoxide of mercury,	HgO^2+2SO^3	or $Hg+2SO^4$
Nitrate of protoxide of mercury,	$HgO+NO^5$	or $Hg+NO^6$
Pernitrate of binoxide of mercury,	HgO^2+2NO^5	or $Hg+2NO^6$
Persulphate of sesquioxide of iron,	$Fe^2O^3+3SO^3$	or Fe^2+3SO^4.

5th. It accounts more easily for the action of metals upon acid solutions. Thus, when zinc is immersed in diluted sulphuric acid, it is generally said that the presence of the acid increases the affinity of the metal for the oxygen of the water, and thus causes a more rapid decomposition of the fluid; for if the acid is not present, the zinc has very little power of decomposing water. But there is great difficulty in perceiving how the presence of the acid should increase the affinity of the zinc for the oxygen of the water, if it is not combined chemically with either of them. On the new theory, the zinc is supposed to have a stronger affinity for sulphatoxygen, than for oxygen alone: it therefore quickly combines with it, and the hydrogen is simply set free as a gas. Thus,

$$Z+(SO^4+H)=(Z+SO^4)+H\uparrow.$$

6th. Voltaic decompositions are more easily explained on this theory. The changes which take place in the sulphate of copper in

Daniell's constant battery are, at present, thus explained—Oxide of copper, sulphuric acid, and water are present. The zinc plate becomes oxidised at the expense of the water, and the oxide formed combines with the sulphuric acid. The liberated hydrogen is meantime transferred along with the oxide of copper to the copper plate, where it reduces the oxide and combines with its oxygen to form water, whilst the copper is deposited. On the new theory, the sulphatoxide of copper is at once decomposed; the sulphatoxygen combines with the zinc, and the copper is deposited: thus,

Old Theory, $Zn+HO+\underline{CuO,SO^3}=ZnO,SO^3+H+CuO=\underline{ZnO,SO^3}+HO+Cu$
New Theory, $Zn+HO+\underline{Cu.SO^4} \qquad = Zn,SO^4+HO+Cu$

Objections.—1st. These *radicals* are all hypothetical; and have never been isolated. A new one must also be created for every oxy-acid. (Ans.—Some of the recognised oxy-acids, as oxalic and acetic, are however equally incapable of exhibition, apart from water, or a base.)

2nd. The salts of phosphoric acid are supposed to be inimical to this view. Professor Daniell has, however, shown that they may be reconciled with it.

3rd. It appears to be inconsistent with the constitution of the triacetate of lead, which consists of three eqs. of oxide of lead, and but one of acetic acid. There is, therefore, an excess of two equivalents of oxygen above what is required for the formation of acetoxygen.

It must be considered that, at present, these views are hypothetical; but they are daily gaining ground in the estimation of chemists. With one or two exceptions, the constitution of the pharmacopœial salts will be given only on the old view.

For a more detailed account of this new theory, see Daniell's Introduction to Chemical Philosophy, edit. 2nd, and Graham's Elements of Chemistry.

PRÆPARATA EX ALUMINIO.

PREPARATIONS OF ALUMINIUM.

ALUMINIUM.

Symb. Al. Eq. 13·7, *Berzelius;* 10, *Thomson.*

Remarks.—Aluminium is the metallic basis of alumina, which is the basis of alum, clay of all kinds, and some precious stones; of which the emerald, amethyst, and garnet are examples.

The equivalent of this metal is estimated differently by different chemists, according to what they conceive to be the constitution of alumina. Berzelius, and most chemists, think that it is composed of 2 eqs. of aluminium, and 3 eqs. of oxygen; and as its combining proportion is 51·4, the subtraction of 24, for the oxygen, leaves 27·4 for the 2 eqs. of the metal, 1 eq. being, therefore, 13·7. Thomson, on the other hand, considers alumina to be a compound of 1 eq. of metal, and 1 eq. of oxygen, and its combining proportion he finds to be 54, instead of 51·4. Now there is no doubt about the actual quantity of oxygen present, which all chemists agree in estimating at 24. This is equal to 3 eqs. of oxygen as before, and it leaves 30, as the weight of the metal. If, then, the metal and the oxygen combine in single equivalents, there will be 3 eqs. of aluminium; and the 30, divided by 3, gives 10, as the weight of 1 eq. of the metal. It is by a similar mode of calculation, that the difference in the equivalents of some other bodies, such as arsenic and phosphorus, is explained.

ALUMEN EXSICCATUM, *L. E.* (SICCATUM, *D.*).

DRIED ALUM.

Synonyme. Alumen Ustum Burnt Alum.

Take of Alum, a pound.

Let the alum melt in an earthen vessel over the fire; then let the fire be increased, until the ebullition has ceased.

Description. — Alum is a well-known double salt. It is generally seen in large *octahedral crystals*, though its *primary form* is a cube (*Phillips*). It is very seldom, however, that a single crystal can be found having the octahedral form delineated (in fig. 4, p. 381.). The upper half may be perfectly formed, whilst the lower half is irregular, where it has been separated from the mass of crystals, of which it formed a part. It is very common also to have one side of a perfect crystal encroached upon by other smaller ones, of the same shape. Common alum, which has been made on the large scale, seldom has any distinct smooth crystalline faces, but is a colourless, semitransparent solid, evidently crystalline, and having lines or ridges in various parts, which take a direction similar to those in the figure, from which its form may sometimes be inferred.

Process of manufacture. — Alum is found native in some places, as at Tolfa, in Italy, but what is used in this country is principally made from an *aluminous slate* or "schist," which consists chiefly of alumina, sulphuret of iron, and a salt of potash. By roasting this earth the sulphur combines with oxygen from the air, and forms sulphuric acid, which converts the alumina and iron into sulphate of alumina and iron; and a salt of potash being added, as that contained in the slate itself is not sufficient, the sulphate of alumina combines with it and forms alum. The sulphate of iron, which is very objectionable, is removed by dissolving the mixed mass, and evaporating it. The sulphate of iron is less soluble than the alum, and is thus separated as it crystallises, whilst the alum remains in solution.

Properties. — Alum is readily dissolved by hot or cold water, and the solution turns litmus paper red. It has a sweetish astringent taste. *Roche alum* has a red tinge, and is thought to be more valuable than common alum. It is however nothing but this salt coloured by bole, rose pink, or calamine. When alum is heated, it melts in its water of crystallisation; swells up considerably; loses its water; and becomes soft, spongy, and friable. If the heat is raised too high, it loses a portion of its acid.

Composition. — According to Berzelius, it consists of,

1 eq. of sulphate of potash, 1 eq. of tersulphate of alumina, and 24 eqs. of water ; $KO, SO^3 + Al^2O^3, 3\ SO^3 + 24\ HO$, or

$$\dot{K}\dddot{S}, \dddot{Al}^2\ 3\ \dddot{S}, 24\dot{H}\ ;\ \text{eq. } 475.$$

Tests and adulterations. — Crystallised alum is not liable to be adulterated.

Medicinal properties. —*Styptic*, *astringent*, and *sedative ?* Applied locally, it constringes the vessels and muscular fibre, and thus checks hæmorrhages. It produces the same effect in many instances, when taken internally, perhaps acting locally as it is carried through the circulation. In *large* doses it is *irritant*, and causes vomiting and *sometimes relaxation of the bowels*. It allays the pain of colic when taken in full medicinal doses. Burnt alum causes the absorption of fungous granulations, known as proud flesh.

Uses. — Both externally and internally, it is administered in *hæmorrhages* and excessive *mucous discharges*, as in bleeding from the nose, hæmoptysis, hæmatemisis, hæmaturia, menorrhagia, leucorrhœa, and gonorrhœa. It is used as a *gargle* in *relaxation of the uvula*, or "clergyman's throat," and as a lotion to promote the cicatrisation of languid ulcers. Dr. Ashwell recommends a strong solution of alum (℔j, or more, in a gallon of water), as a *hip bath*, for the relief of *prolapsus uteri;* and his recommendations are amply supported by the good effects obtained from this treatment by other practitioners. In the Dublin Lying-in-Hospital, a *pessary* is used in *prolapsus uteri*, which is composed of equal parts of powdered galls and powdered alum, enclosed in a fine muslin bag. This is introduced into the vagina, and produces excellent effects. Its use may be continued for several days together, or, if necessary, for some weeks. *Boiled with milk*, alum forms a curd which makes an excellent *poultice* to be applied to the *eyes of infants*, in every stage of *purulent ophthalmia*. This is constantly used at the Dublin Lying-in-Hospital. A solution of alum is employed as a *collyrium*. When finely powdered, it is recommended by Bretonneau, that it should be blown through a quill into the throat, in *diphtheritis*, or that peculiar inflammation of the mucous membrane, which is accompanied with the formation of false membrane. The most remarkable employment of alum is in the treatment of *lead colic*, in which repeated experience has shown that it allays the pain, and causes the emptying of the bowels, when powerful purgatives have failed. It has been thought that this effect was owing to the combination of the sulphuric acid with the lead in the intestines; but Kopp (quoted by Pereira) has found it to allay the pain of colic, which was not caused by lead, and was unaccompained by constipation. From this, it would appear to possess a sedative power over the muscular coat of the bowels. It must be given in large doses (℈j to ʒij), frequently, in some demulcent mixture; and opium or camphor is beneficially combined with it. Alum has been recommended by Dr. Golding Bird, in the later stage of *hooping cough*, to relieve the excessive secretion of mucus. *Burnt alum* is sprinkled upon *fungous granulations* to keep them down, and is blown through a quill into the eye to remove *opacity* of the *cornea*, when this is *very chronic*.

Incompatibles.—Alum is very frequently combined with vegetable astringents, but it is doubtful whether this is a good plan; for the astringent principle (tannin) forms an insoluble compound with the alumina. Experience, however, seems to be in favour of the combination. Alkalies and alkaline carbonates decompose it.

Dose.—The strength of the solution for the various purposes mentioned, is very different; ʒj or ʒij to the pint of water as an astringent for languid ulcers; ℥ss to ℥j, in the pint, for leucorrhœa, and to check hæmorrhages; and ℈j to ʒj to the pint as a collyrium.

In the treatment of colic, the dose of powdered alum is ℈j to ʒij, every three or four hours.

LIQUOR ALUMINIS COMPOSITUS, *L.*

COMPOUND SOLUTION OF ALUM.

Take of Alum,
Sulphate of zinc, each, an ounce.
Boiling water, three pints.

Dissolve the alum and sulphate of zinc together in the water; afterwards strain.

Medicinal properties and uses. — This solution is powerfully *astringent*, and when diluted is successfully used as a lotion to *old ulcers*. It is highly commended by Dr. Addison, as an injection in *leucorrhœa*, and in *hysteria* connected with either an *excessive* or a *deficient uterine discharge*. Its employment ought to be discontinued during the ordinary menstrual period.* It is difficult to speak too highly of the good effects which it produces in these cases.

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* On the Disorders of Females connected with Uterine Irritation. [I think I am not overstepping my province in recommending the careful perusal of this work, especially to junior practitioners.—I. B. N.]

The solution, diluted with six or eight times the quantity of rose-water, is a good collyrium in conjunctival inflammation. The diluted solution is also used as an injection in gonorrhœa and gleet.

PRÆPARATA EX ANTIMONIO.

PREPARATIONS OF ANTIMONY.

ANTIMONIUM (STIBIUM).

ANTIMONY. *Symb.* Sb. Eq. 65. 129. or 130.

Synonyme. Regulus of Antimony.

Description. — Antimony is a crystalline metal with a high degree of lustre, and a bluish-white colour. Its sp. gr. is 6·7. It is often regarded as volatile, but if air is perfectly excluded, and no gases are formed during the process, it is not sublimed even by a white heat (*Turner*). It is obtained chiefly from the tersulphuret which exists in Cornwall, Hungary, and other places.

Medicinal properties of the compounds of antimony.—The metal is said to take its name (*anti-moines*, against monks) from one of its preparations, when first used in medicine, having nearly killed one of that order by its violent emetic properties. All the compounds of this metal excite vomiting if given in sufficient doses, and nausea and diaphoresis in smaller ones. Some of them also act upon the bowels. They also belong to the nondescript class, "alteratives," and sometimes produce beneficial effects upon a disordered glandular system.

Characteristics of antimonial compounds as poisons. — They are generally so quickly rejected from the stomach, that they seldom cause death. They occasion severe and obstinate vomiting, accompanied by great depression, and if in excessive doses, burning pain in the stomach, constriction of the throat, purging, fainting, and in some rare cases, death, from the severity of the inflammation excited in the stomach and bowels.

Post-mortem appearances.—Inflammation of the mucous membrane of the stomach, duodenum, and small intestines, but not ulceration.

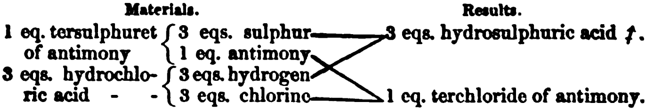
ANTIMONII TERSULPHURETUM, *L.*

TERSULPHURET OF ANTIMONY.

Synonyme. Antim. Sulphuretum, *D. E.* Antim. Sesquisulphuretum, *Ph. L.* 1836. Common or Crude Antimony.

Remarks. — This compound of antimony, from which all the others are formed, directly or indirectly, is found abundantly in nature, and is therefore placed in the Materia Medica. It is separated from the earthy matters with which it is associated, by being heated in perforated crucibles in a reverberatory furnace, by which it is fused, and runs from the crucibles into a place prepared for it below them. It was called sesquisulphuret in the last Pharmacopœia, — a name now changed for tersulphuret, in consequence of a change in the theory about the equivalent of antimony. It is far more commonly designated by the Dublin and Edinburgh name of sulphuret than by either of the London names.

Description and properties. — Tersulphuret (sulphuret) of antimony of commerce is a heavy, dark, crystalline, pulverisable mass, which is black when powdered; when *precipitated* as a *hydrate* from the soluble compounds of the metal, it is, however, *orange-red.* It is fusible at a high temperature, and is volatile if air is not entirely excluded. If pure, it is entirely dissolved by hydrochloric acid, aided by heat, and terchloride of antimony is formed and dissolved, whilst hydrosulphuric acid is given off; which is a convenient mode of obtaining this gas for purposes of experimenting or for testing.



When water is added to this solution, it is decomposed, and a white precipitate is thrown down. (See Antim. Oxid.)

Powders for which tersulphuret of antimony may be mistaken.— All the black powders of the Pharmacopœia. It is distinguished from them all by its solubility in muriatic acid, and the formation of a white precipitate on the addition of water.

Composition. — Tersulphuret of antimony consists, according to the pharmacopœial name, of

1 eq. antimony, 130; 3 eqs. sulphur, 16×3, $48 = Sb, S^3$; eq. 178.

ANTIMONII OXIDUM, *E.*

Oxide of Antimony.

Synonyme. Sesquioxide or Oxy-chloride of Antimony. Powder of Algaroth.

Take of Sulphuret of Antimony, in fine powder, four ounces.
Muriatic acid (commercial), one pint.
Water, five pints.

The sulphuret is to be boiled in the muriatic acid for half an hour; filtered, and poured into water. When this is done, a white precipitate is thrown down, which consists of antimony, oxygen, and chlorine. When this is washed with a weak solution of carbonate of soda the chloride is separated, and nothing is left but oxide.

Medicinal properties and uses.—Slightly diaphoretic. It is a very unimportant preparation, and is seldom used.

Dose.—Gr. v to gr. x.

ANTIMONII OXYSULPHURETUM, *L. D. E.*

OXYSULPHURET OF ANTIMONY.

Synonyme. Antim. Sulphuretum Præcipitatum, *D.* Antim. Sulphuretum Aureum, *E.* Golden Sulphuret of Antimony. Liver and Crocus of Antimony. Kermes Mineral (not quite identical).

Take of Tersulphuret (sulphuret) of antimony, powdered, seven ounces.
Solution of soda, four pints.
Distilled water, two gallons.
Dilute sulphuric acid, as much as may be sufficient.

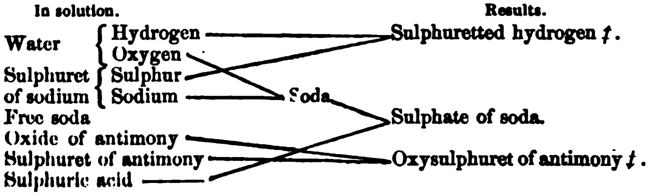
Mix the tersulphuret and soda in the water, and boil with a slow fire for two hours, frequently stirring, distilled water being often added, that it may fill about the same measure. Strain the liquor, and gradually pour into it as much of the acid as may be sufficient to precipitate the oxysulphuret of antimony; then, with water, wash away the sulphate of soda, and dry what remains with a gentle heat.

The directions are essentially the same in the Dublin and Edinburgh Pharmacopœias.

Process. — When tersulphuret of antimony is boiled with solution of soda or potash, the mixture soon assumes a brownish-red colour, and a considerable portion of the sulphuret is dissolved, whilst a red insoluble compound of sulphur, antimony, and soda, remains in the vessel. The soluble portion is then obtained clear by filtration, and dilute sulphuric acid is added. When this is done, a red precipitate immediately falls, which is the oxysulphuret of antimony, and sulphuretted hydrogen is at the same time given off as a gas.

Decomposition.—When sulphuret of antimony is boiled in solution of potash or soda, a very complicated series of changes takes place, which may, however, be expressed generally, by saying that part of the sulphuret is dissolved unchanged, whilst another portion is decomposed by the soda, taking oxygen from it and being converted into oxide of antimony and giving up its sulphur, which converts the sodium set free into sulphuret of sodium. The oxide thus formed is held in solution by excess of soda. There are, therefore, in the fluid, sulphuret and oxide of antimony held in solution by excess of soda, and some sulphuret of sodium. When dilute sulphuric acid is added, it neutralises the soda, and the two compounds of antimony fall down together. At the same time, it decomposes the sulphuret of sodium and water; the hydrogen of the latter forms sulphuretted hydrogen with the sulphur of the former, which escapes as gas; and the oxygen converts the liberated sodium into soda, which combines with sulphuric acid, and forms a farther quantity of sulphate of soda.

The following diagram indicates the general principle of the changes which take place; but is not intended as a correct expression of the number of equivalents concerned, which are acknowledged by all chemists to be very variable.



Properties.— Oxysulphuret of antimony is a red or brownish-red powder; insoluble in water; soluble, when recently prepared, in solution of potash; and is almost entirely dissolved, with evolution of sulphuretted hydrogen, by hydrochloric acid, to which a few drops of nitric acid have been added. The small portion which is not dissolved is sulphur (*Pereira*).

Composition.— Oxysulphuret of antimony is a variable mixture of tersulphuret and teroxide of antimony and water. Mr. Phillips finds that it contains,

Tersulphuret of antimony - - - - -	5 eqs.
Teroxide of antimony - - - - - -	1 eq.
Water - - - - - - - -	15 eqs.

Its symbol is, therefore, $5\,SbS^3, SbO^3, 15\,HO$.*

Tests and impurities.— It is not liable to adulteration. The London characters and tests correspond with "properties" above given.

Compounds for which it may be mistaken.—Red lead; precipitated tersulphuret of antimony; binoxide, bisulphuret, and *biniodide of mercury.* Its solubility in hydrochloric acid, with the escape of sulphuretted hydrogen, distinguishes it from the first; the difference of colour from the second; and its remaining fixed on the application of the heat of a spirit-lamp from the last three. It is also much lighter than either red lead or the compounds of mercury.

Medicinal properties.—Alterative and *emetic.* Its powers are very uncertain, and not to be relied on. It acts upon the glandular and cutaneous systems, and in large doses causes vomiting and the usual effects of antimonial compounds.

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* Trans. of Pharm. 1851.

Uses.—It is never used alone, but is combined with calomel, guiacum, or narcotics, in *chronic rheumatism*, *dry cutaneous diseases*, *syphilis*, and *glandular enlargements*. It is never used as an emetic.

Dose.— Gr. j to gr. iij.

Officinal preparations. — Pil. Hydrarg. Chlorid. co.

ANTIMONII POTASSIO-TARTRAS, *L.D.E.*

POTASSIO-TARTRATE OF ANTIMONY.

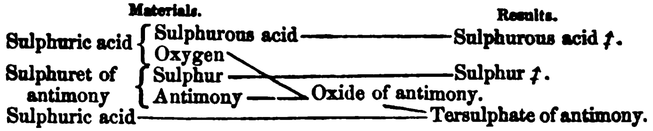
Synonyme. Antimonium tartarizatum, *D.* Antimonii tartarizatum, *E.* Tartar-emetic.

Take of Tersulphuret of antimony, rubbed into a very fine powder, a pound.
Sulphuric acid, fifteen fluid ounces.
Bitartrate of potash, ten ounces.
Distilled water, five pints.

Mix the tersulphuret with the acid in an iron vessel. Apply a gentle heat to them under a chimney, frequently stirring with an iron spatula. Then increase the heat until the flame of the burning sulphur having gone out, nothing remains except a whitish pulverulent mass. When this has cooled, wash it with water until nothing can be perceived, and dry it. Mix nine ounces of this salt carefully with the bitartrate, and boil for half an hour in water. Strain the liquid whilst still hot, and set aside, that crystals may be formed. Having poured off the (remaining) liquid, dry them, and again evaporate the solution that more crystals may form.

The Dublin and Edinburgh Pharmacopœias direct oxide of antimony (recently made, *E.*) to be boiled with bitartrate of potash in water. The proportions used are nearly alike, but not quite, ℥v of the oxide and ℥vi of the bitartrate. The solution is to be set aside to crystallise, as in the Ph. L.

Process.—When sulphuret of antimony is burnt with sulphuric acid, sulphur is separated. Sulphurous acid is evolved, and sulphate of antimony remains. In the following diagram the outline of the changes is indicated, without professing to give the exact number of equivalents concerned.



When this tersulphate of antimony is boiled or washed with water it is decomposed, part of the sulphuric acid being washed away, and a sulphate remains. When this sulphate is boiled with bitartrate of potash, it is again decomposed; the sulphuric acid leaving the antimony, and having its place supplied by the tartaric acid, which forms tartrate of antimony; this combines with tartrate of potash from the bitartrate, and forms potassio-tartrate of antimony.

Composition.—It consists of,

1 eq. tartrate of antimony, $SbO^3,\bar{T}$, 1 eq. tartrate of potash $KO,\bar{T}$, and 3 eqs. of water, $3\,HO = \underline{SbO^3,\bar{T}} + \underline{KO,\bar{T}} + \underline{3\,HO}$; eq. 361.

Properties.—Potassio-tartrate of antimony is generally sold in the state of a colourless powder; but when properly prepared it is in the form of small crystals, the figure of which can scarcely be detected by the naked eye. When examined with a microscope, magnifying about four times, they may be seen to be octahedral. Their *primary* form is that of an *octahedron*, with a *rhombic base*. They are soluble in three times their weight of boiling water, but require fifteen times their weight of water at 60° F. for solution. They are slightly efflorescent, and soon become opaque on exposure to the air. They slightly redden litmus paper. They are insoluble in alcohol. Their taste is *slightly* styptic. It does not answer to keep them long dissolved in simple water as the solution soon decomposes.

Characters and tests.—Colourless; it is soluble in water. The solution is not changed by ferrocyanide of potassium (showing the absence of iron from the process of manufacture). Hydrosulphuric acid being added, it throws down something of an orange colour; chloride of barium or nitrate of silver being added, it throws down nothing, or only what is again dissolved on the addition of water (showing the absence of sulphuric acid from the manufacture, and of common salt from its being accidentally present in the cream of tartar). It throws down a precipitate by nitric acid, which is dissolved by an excess of the same acid. Hydrosulphuric acid throws down forty-nine grains of tersulphuret of antimony from one hundred grains (of this salt) dissolved in water.

Tartar emetic is not likely to be intentionally adulterated, but it sometimes contains a little lime, which is often present in small quantity in common bitartrate of potash. It ought not to produce a precipitate with solution of oxalate of ammonia.

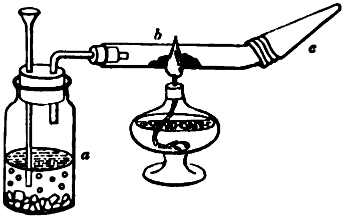
Tests. — As the detection of this substance is sometimes important, in consequence of its poisonous properties, minute tests are given in this place. They are very simple and complete.

For antimony in solution. Tartar emetic is the only soluble salt likely to be met with. If a stream of sulphuretted hydrogen (hydrosulphuric acid) is passed through the solution, or hydrosulphate of ammonia is added to it, an *orange-red* precipitate of hydrated tersulphuret of antimony is thrown down. This precipitate may possibly be mistaken for that of tersulphuret of arsenic. It is distinguished by the following characters: —

Tersulphuret of antimony.	Tersulphuret of arsenic.
Orange red.	Yellow.
*In*soluble in potash or ammonia.	*Soluble* in potash or ammonia.
Soluble in boiling hydrochloric acid.	*In*soluble in boiling hydrochloric acid.
Not volatilised in a *test tube* by the heat of a spirit-lamp.	*Volatilised* in a *test tube* by the heat of a spirit-lamp.

If this precipitate is washed and dried, it is readily dissolved by hydrochloric acid aided by heat, and sulphuretted hydrogen is given off. This may be detected by making the solution in a test tube, and holding in the mouth of the tube a piece of white paper, moistened with solution of acetate of lead, which becomes brown or black when the gas comes in contact with it. To the solution thus obtained, add a few drops of *water*, and a *white* precipitate of *oxychloride* of *antimony* will be thrown down.

The metal may be obtained in the metallic state by heating the *dried* precipitate of tersulphuret in a tube of *hard German* glass, and passing a current of hydrogen over it. The hydrogen takes the sulphur, and leaves the metal which is carried to a little distance by the current of gas and the heat together, but is not really sublimed. The gas evolved may be proved to be sulphuretted hydrogen by making it pass through a little cone of white paper, moistened by a solution of acetate of lead, and fastened upon the end of the reduction tube.



a. Wide-mouthed bottle, containing zinc and dilute sulphuric acid, for generating hydrogen.
b. Tube of hard German glass, containing the tersulphuret of antimony.
c. Cone of paper moistened with solution of acetate of lead.

Salts for which it may be mistaken.— Any white soluble powder.

It is at once distinguished by sulphuretted hydrogen, which produces an orange precipitate with the antimony present in it.

Medicinal properties.—*Nauseating emetic; sudorific; aperient; irritant; rubefacient.* Its effects vary with the dose in which it is taken. If taken in a small dose (gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$), tartar-emetic excites nausea, but seldom vomiting; clammy sweat; the heart's action is lowered, and the pulse becomes feeble; and this state may be kept up for many hours or days, by repeating the dose at short intervals. In a full dose (gr. $\frac{1}{2}$ to gr. ij), it acts as a decided emetic, this effect being preceded by cold sweat, great nausea, and depression, and the vomiting returning several times; it frequently acts at the same time upon the bowels. When given in small quantities (gr. $\frac{1}{8}$), combined with purgative medicines, it promotes their effects, probably by increasing the secretion from the intestinal mucous membrane. A remarkable circumstance connected with its emetic properties has been noticed by Rasori, viz. that in acute inflammation of the lungs (pneumonia), there is an increased tolerance of this medicine, so that it does not produce its usual emetic effects, but seems to expend its energy in subduing the inflammatory action. He has given as much as several drachms in a few days, without producing vomiting or purging, and his statement has been confirmed by Louis, and other Continental writers. It is not, however, usual in this country, to give it in anything like such large quantities, even in acute inflammation; and it often causes vomiting in young children when given even in moderate doses, for the cure of pneumonia. Rasori has further asserted, that as the inflammation subsides, the tolerance of the medicine diminishes; but this observation is not confirmed by the experience of English practitioners. Many physicians are very strongly opposed to the administration of this remedy to infants, asserting, that upon them it produces violent and injurious effects, frequently causing severe purging. It is, however, daily administered to young infants, by practitioners of care and judgment, without any prejudicial consequences. When given in still smaller doses (gr. $\frac{1}{16}$ to gr. $\frac{1}{10}$), it appears to exert a remarkable influence upon the state of the capillaries, diminishing their size, and thereby the quantity of blood contained in them, and thus producing marked benefit in a *congested*, but not *inflamed* state of various organs. In some cases of *congestion* of the lungs, in which for previous inflammation depletion had been carried to its extreme limit, but where death seemed at hand from the blueness of the countenance, and the oppressed breathing, tartar-emetic, in doses of gr. $\frac{1}{12}$, every two hours, produced the most remarkable improvement in about eighteen or twenty-four hours (*Mr. May*). And Dr. Billing mentions a case of obstinate diarrhœa, depending, as he supposes, upon congestion of the alimentary mucous membrane, in which similar doses effected a cure after the failure of other means.[*]

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[*] First Principles of Medicine.

Dr. Henriques of Kingston, Jamaica, has noticed that in congestion of the liver with disordered secretions, this medicine, in the above small doses, repeated every one or two hours, acts much more favourably than blue pill, which is generally prescribed. The biliary secretion becomes more natural; the bowels are relaxed; the skin assumes a more healthy action; and the enlargement of the liver is removed. He generally prefaces an aperient of blue pill and compound extract of colocynth.

In an obstinate case of jaundice, in which, for above six weeks, there had been no trace of bile in the fæces, I gave $\frac{1}{12}$ gr. of tartar-emetic every hour; the patient being so restless that he could take it with regularity without having his sleep disturbed on purpose. In two days the stools began to be tinged with bile, and it was then given not quite so often. In a few days more they had assumed a natural character; and the colour of the skin, which had been extremely deep throughout, became lighter, and from this time gradually disappeared, as in an ordinary case.

When applied *externally*, tartar-emetic produces first, redness, and afterwards an eruption of large and deep flat-topped pustules, which are surrounded by a circle of inflammation. These are not generally very numerous or close to each other, but they are often exceedingly painful, and are sometimes, though very seldom, attended with dangerous consequences. I knew the case of a middle-aged lady who nearly lost her life from sloughing, in consequence of two applications of the ointment to her chest; and Pereira mentions the case of a child two years old, who was killed by it. This is, however, so rare a result that we need never be deterred from using the ointment for fear of producing this effect. In order to diminish the size and depth of the pustules caused by this substance, the late Mr. Wildsmith of Leeds was in the habit of combining about twenty drops of (strong) sulphuric acid with half an ounce of the ointment; which he found to have this effect. The length of time required for producing the eruption varies in different people. Three applications frequently suffice. The local employment of tartar-emetic is sometimes followed by an eruption of pustules in a different part of the body. Two cases are reported in the "Chemist," vol. iv. p. 281., in which inunction upon the chest and knee was followed by extensive pustular eruption upon the scrotum. From the care which was taken, there was no reason to think that the ointment had been carried thither by the unwashed hands; a supposition which has been employed to account for this occurrence in other cases.

Characteristics as an emetic.—Potassio-tartrate of antimony acts pretty certainly, but not quickly; it causes more nausea and depression than any other emetic; it frequently also purges, and generally occasions sweating; it is long before its emetic effects entirely cease.

In poisonous doses, it operates sometimes as an *irritant poison*, causing intense abdominal pain, vomiting, profuse purging, delirium, and death. It seldom produces these results, as it is generally rejected from the stomach before sufficient time has elapsed; but there are some fatal cases on record.

A form of poisoning by tartar-emetic, when given medicinally in the treatment of pneumonia, appears to be not uncommon in the Southern States of America, from the following description abridged from Dr. Boling (Amer. Journ. Med. Sc. q. by Ranking, Abs. vol. xv. p. 25.): — "All the symptoms improving under the use of antimony, when sometimes gradually, sometimes suddenly, dry tongue, thirst, restlessness, purging, tympanitis, vomiting, or retching, anxiety of countenance, delirium, sometimes stupor, and death supervene. Death sometimes takes place within six hours of the first appearance of these unfavourable symptoms. It is sometimes delayed twelve hours or longer. Along with these symptoms, or just preceding them, there is a *rapid* disappearance of the pneumonic signs; a lung which seemed almost solidified becoming permeable in four or five hours." The occurrence of the least tympanitis, thirst, or diarrhœa in pneumonia treated by antimony is regarded by Dr. Boling as a very formidable symptom, especially if accompanied by a *rapid*, not a *gradual* disappearance of the dulness on percussion, and the crepitant rule. In such cases the prognosis is in the highest degree unfavourable.

Uses. — *Pneumonia.* It is more frequently used, and with better results, in this disease, than in any other. It should not generally be given until after a single free bleeding, and the dose is generally gr. ¼ to gr. j, every two or three hours, until the violence of the inflammation abates. In *bronchitis*, it is an excellent remedy; but the dose is usually somewhat smaller. In *pleurisy*, it does not produce such good effects as in the two previous diseases. In *albuminuria*, or the disease characterised by the presence of albuminous urine, it is beneficially given in the *early* stage, especially if the disease is the *consequence* of a *known exposure to cold*, and whilst there are any symptoms of an *acute character*; but its utility is very questionable in that later stage, which is much more strongly characterised by symptoms of debility, than by those of a sthenic form. In *fever*, it is highly useful, whilst the skin is hot and dry and the pulse full and strong; but it is too depressing for the latter stages, when the symptoms have assumed more of a typhoid character. When there is great cerebral excitement and want of rest, Dr. Graves strongly commends its employment combined with opium, and his experience is fully confirmed by that of other physicians.* In *intermittent fever* in the East Indies, Mr. Moore strongly advocates the employment of tartar-emetic in preference to bark, arsenic, or other remedies, and appeals to the results of 300 cases in the regimental hospital in proof of its efficacy. His plan of treatment has not been followed in this country so far as I am aware; but the severity and course of intermittents in the tropics varies so much from what we see in this climate, that observations true there may not be equally applicable here. His plan is to give gr. $\frac{1}{130}$, $\frac{1}{50}$, $\frac{1}{10}$, or $\frac{1}{8}$ every half hour or hour, according to the severity of the case and the age of the patient, so as to keep the system in a constant state of prostration during not only the cold but the hot and the sweating stage. It must not be given so as to produce vomiting or purging, but previous thorough evacuation of the bowels by calomel, jalap, and black draught is always to be insisted upon. As the case advances the frequency of the dose may be diminished. Occasionally it happens in protracted cases that the system becomes insensible to the tartar-emetic, and large doses fail to keep up any nausea. It must then be discontinued for a few days, and a few ounces of blood taken by leeches or cupping from the epigastrium or region of the liver, and afterwards a calomel purge; after which the tartar-emetic may be resumed in small doses as at first, with marked improvement. "In three-fourths of the patients thus treated with tartar-emetic, without bark, or other antiperiodics, the attacks of intermittent fever, if not cut short at once, have been modified. Each paroxysm has been less acute, and the duration of every stage has been modified. Unaided, the tartar-emetic has seldom failed in subduing uncomplicated intermittent fever, however acute; and aided by the lancet, cupping, or leeches, and mercurial purgatives, it has seldom failed in cases complicated with congestion and inflammation of one or more internal viscera."* This plan of treatment is so different from the one usually adopted, as to excite a degree of surprise at first at the similarity of result obtained by such opposite modes of practice. The reader is referred to some very interesting and practically valuable observations by Dr. Billing†, which will help to account, on rational principles, for this and some other apparent inconsistencies in medical practice. In *acute rheumatism*, especially of the articular form, it has been used with good effects, and also in *arachnitis*. In *inflammation of the mammæ*, and in the febrile attack which generally occurs on the appearance of milk in these organs after delivery, the best effects follow the frequent use of small doses (gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$) of tartar-emetic; and it is constantly employed for this purpose in the Dublin Lying-in-Hospital. In *dislocation of the joints*, previous to attempting reduction, it used to be given in doses of gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$, every ten minutes, to produce nausea, and consequent relaxation, but is now superseded by chloroform. In *puerperal convulsions*, after the bleeding, I have repeatedly seen it used in the above-mentioned institution, with excellent effects.

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* For details respecting this important practice, see Clin. Lect on Pract. of Med. by Dr. Graves, 1848, pp. 197-248.

As an *emetic*, it is given on the *very accession* of *fever*, and frequently cuts it short, if given early enough. It is also given during the *remissions* of *remittent fever*. In *bilious fever* or a *threatened attack of jaundice*, and on the accession of most *infantile diseases*, as *scarlatina* and *measles*. In *croup*, it is a most valuable agent, not only reducing the inflammatory state, but removing by vomiting and coughing the membranous secretion already formed. In *swelled testicle* and *acute ophthalmia*, unceasing nausea is one of the best remedies. In *obstinate constipation* dependent upon the *absence of mucus to lubricate the intestines*, tartar-emetic sometimes produces relief. An old man had had no evacuation from the bowels for eleven days, notwithstanding the employment of purgatives of every description, and of glysters large and small. I gave him gr. $\frac{1}{4}$ every hour, with ʒj of salts. He was constantly nauseated by it, and in six hours passed a large mass of dry hardened fæces, after which he had no further ailment. In cases of *poisoning*, especially with *narcotic poisons*, it ought *not* to be given; it is too slow and depressing in its effects. In *very small doses*, it is a frequent adjunct to purgatives, and is highly valuable in *congestions* of the *mucous membranes* generally (see *Medicinal properties*).

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* The subject is treated at greater length in Braith. Retrosp. vol. xx. p. 6.

† First Principles of Medicine. Chapter on Tonics throughout.

As a *counter-irritant*, the ointment is used (see UNG. ANTIM. POTAS.-TART.) in *chronic coughs* and *pulmonary affections*; in *chronic* inflammatory affections of the *joints*; and in *hysterical* affections of the *spine* and *limbs*.

Antidotes. — Emetics should be avoided, but *warm water* may be given; and, as soon as possible, an infusion or decoction of oak bark, tea, or any *astringent* vegetable. The tannin combines with the oxide of antimony and forms an insoluble and inert compound. *Cinchona bark* has usually been advised; but Pereira has shown that this vegetable does not destroy, or even disguise its emetic and purgative properties, and that it is far from being a good antidote, even if it were the one most likely to be at hand. *Opium* ought to be given to check profuse vomiting or purging; and blood-letting and general antiphlogistic treatment may be required to subdue the subsequent inflammation.

Doses. — As an *emetic*, gr. j to gr. ij, generally combined with ℈j of ipecacuanha. As a *nauseant* and *sudorific*, gr. $\frac{1}{8}$ to gr. $\frac{1}{2}$, in repeated doses. As an *adjunct* of *purgatives*, gr. $\frac{1}{16}$ to $\frac{1}{8}$; and as an *astringent* (see Billing's First Prin. of Med.), gr. $\frac{1}{18}$ to gr. $\frac{1}{12}$.

Incompatibles. — It is not likely to be prescribed with any incompatible medicine.

Officinal preparations. — Vinum (et Liquor, *D.*) Antimonii Potassio-tartratis. Unguentum Antimonii Potassio-tartratis.

ANTIMONII TARTARIZATI LIQUOR, *D.*

Take of Tartarised antimony, fifty-five grains (ʒj avoir.).
Distilled water, one pint.
Rectified spirit, seven fluid ounces.
Dissolve.

Remarks. — This is very nearly the same strength as the Vin. Antim. Tart. of the Ph. L.: the difference is so slight as to be inappreciable in its effects.

VINUM ANTIMONII POTASSIO-TARTRATIS, *L.E.*

WINE OF POTASSIO-TARTRATE OF ANTIMONY.

Synonyme. Vinum Antimoniale, *E.*

Take of Crystals of potassio-tartrate of antimony, two scruples.
Sherry wine, one pint.
Rub the crystals into powder, and dissolve.

Remarks. — This preparation is to be made from the *crystals* of potassio-tartrate of antimony, as the powdered salt often contains an excess of bitartrate of potash, which occasions a deposit in the solution.

One ounce of this solution contains two grains of the salt.

Properties, uses, &c. — See ANTIMONII POTASSIO-TARTRAT. p. 396.

Dose. — ♏xxx, contains ⅛ of a grain. ♏xv to fʒj, as an expectorant; fʒij to f℥j, as an emetic.

PULVIS ANTIMONII COMPOSITUS, *L.D.E.*

COMPOUND POWDER OF ANTIMONY.

Synonyme. Pulvis Antimonialis, *D. E.*

Take of Tersulphuret of antimony, powdered, a pound (℔ij *E.*).
Hartshorn shavings, two pounds.

Mix and throw them into a crucible red hot in the fire, and stir constantly until vapour no longer arises. Rub what remains to powder, and put it into a crucible. Then apply fire, and increase it gradually that it may be red hot for two hours. Rub the remaining powder that it may be as fine as possible.

Process. — Horn consists of phosphate of lime and gelatine. The latter is dissipated by the burning, but the former remains unchanged. By the heat, the sulphur of the tersulphuret of antimony is driven off, and the antimony absorbs oxygen from the air, and is converted into antimonious acid, SbO^4, and teroxide of antimony SbO^3. Part of the antimonious acid combines with part of the lime, and what remains in the crucible is therefore a mixture of teroxide of antimony, and antimonious acid, antimonite and phosphate of lime.

D. Take of tartarised antimony, phosphate of soda, of each, ℥iv; Chloride of calcium, ℥ij; Solution of ammonia, f℥iv; Distilled water, cong. jss, or a sufficient quantity. Dissolve the tartarised antimony in half a gallon, and the phosphate of soda and chloride of calcium, each, in a quart of water. Mix the solutions of the tartarised antimony and phosphate of soda when cold, and then pour in the solution of chloride of calcium, having first added to the latter the water of ammonia. Boil for twenty minutes, and having collected the precipitate on a calico filter, wash it with hot distilled water, until the liquid which passes through, ceases to give a precipitate with a dilute solution of nitrate of silver. Finally, dry the product by a steam or water heat, and powder.

Remarks. — The result in this case is in the main similar to that of the Ph. L. When phosphate of soda and ammonia are boiled with a salt of lime (the chloride of calcium) and tartrate of antimony, all are decomposed, and phosphate of lime and oxide of antimony are precipitated together. But the antimony is combined with a smaller proportion of oxygen, and is, therefore, supposed to be more efficacious; the nearer it approaches to a simple oxide, the more active being its properties.

Properties. — It is a white powder, without taste or smell; insoluble in water; and seldom entirely soluble in hydrochloric acid, which however dissolves the greater part of it.

Composition.— This is uncertain and variable. Mr. Phillips finds it to contain 35 per cent. of antimonious acid, which he now calls antimoniate of antimony, and 65 per cent. of phosphate of lime.

This preparation is introduced as a substitute for the celebrated and expensive James's powder. The composition of the two is somewhat different.

	Pulvis antimon. comp. Phillips.	James's Powder. Pearson.	James's Powder. Phillips.
Antimoniate of antimony	35 or 38	57	56
Phosphate of lime	65 „ 62	43	44
	100 100	100	100

Dr. A. T. Thomson says he has found oxide of antimony in James's powder, to which he ascribes its superiority; but he does not mention the proportion in which it was present; but neither this nor the antimonite of lime discovered by Maclagan has been found by Mr. Phillips.

Tests and adulteration. — This compound is so little liable to wilful or accidental adulteration, that the College does not give any tests. Its partial solubility in hydrochloric acid, and the orange-red precipitate produced in the solution by sulphuretted hydrogen, show it to be an antimonial preparation, and there is no other officinal antimonial compound which is colourless and insoluble in water.

Compounds for which it may be mistaken.—All the white powders in the Pharmacopœia. It must be recognised by the effects of tests.

Medicinal properties. — *Feeble* and *very uncertain*. It is considered to be *diaphoretic;* but it often entirely fails to act. It is also thought to abate the excitement of fever.

Uses.— It is used in *fever* as a diaphoretic, and in *acute and chronic rheumatism*, especially the latter; but every good effect that can be derived from it, is obtained with much greater uniformity and certainty by a mixture of ¼ of a grain of tartar emetic, and eight grains of white sugar.

Dose.— Gr. iij to gr. xv. Usual dose, gr. x.

PRÆPARATA EX ARGENTO.

PREPARATIONS OF SILVER.

ARGENTUM.

SILVER. *Symb.* Ag. Eq. 108.

This metal has a high sp. gr., 10·4, and is very soft and malleable when pure. The silver used by silversmiths, and that employed for making coins, contains a small portion of copper; for, if perfectly pure, it is too soft for ordinary uses. It is entirely dissolved by cold nitric acid, and by sulphuric acid with the aid of heat. From a solution of either of these salts, it is thrown down as a *dense white curdy* precipitate by hydrochloric acid, or any soluble chloride which is redissolved on the addition of ammonia.

Medicinal properties.— Metallic silver is not known to possess any medicinal properties. Some of its compounds may be poisonous if taken in considerable quantities, but there is scarcely a recorded instance of an actual case of poisoning by any of them. When they do thus act, they produce the usual symptoms of irritant poisons,— vomiting; severe abdominal pain; inflammation of the stomach and intestines.

ARGENTI NITRAS, *L.E.* (FUSA, *L.*, FUSUM, *D.*).

NITRATE OF SILVER.

Synonyme. Lunar Caustic. Argentum Nitratum.

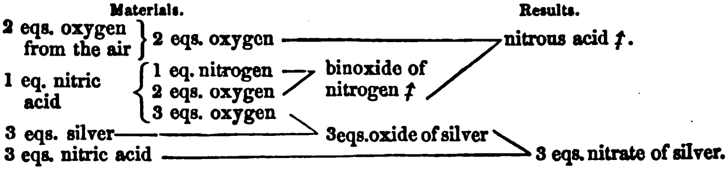
(This compound is now placed in the Materia Medica, and no directions are given for making it. I have therefore taken those of the last Pharmacopœia, 1836.)

Take of Silver, an ounce and a half.
Nitric acid, a fluid ounce.
Distilled water, two fluid ounces.

Mix the nitric acid with the water, and dissolve the silver in them in a sand-bath. Afterwards increase the heat gradually, that the nitrate of silver may be dried.

Melt this in a crucible, with a slow fire, until, the water being expelled, ebullition has ceased; then immediately pour it into proper moulds.

Process.—When nitric acid is poured upon silver, violent action takes place. Part of the acid is decomposed, and gives some of its oxygen to the silver, whilst the remainder flies off, combined with the nitrogen of the acid, as binoxide of nitrogen, which combines with the oxygen of the atmosphere and forms dense, suffocating, red fumes of nitrous acid. The oxide of silver which has been formed, is dissolved by the undecomposed acid, and forms nitrate of silver.



When undiluted acid is employed, the action is inconveniently violent; and a portion of water is therefore first added, which does not make any chemical difference, but merely moderates the action. In this way, a colourless or *very* pale green solution is obtained, and when this is evaporated, crystals of nitrate of silver are obtained. This is not, however, a convenient form for use, and therefore the dried salt is fused, in order to expel any remaining water, and is then poured into suitable moulds. The heat of a moderately high gas flame is sufficient for this purpose; and the moulds are generally made of iron or brass, and capable of holding half an ounce of the salt. When poured in whilst in the fluid state, it readily assumes the form of the mould, and becomes solid in a few minutes.

Description.—Nitrate of silver is generally seen in round sticks, about the size of a common goose-quill. When freshly made, they are perfectly colourless, but soon become black externally on exposure to light. It may be made into crystals, the *primary* form of which is a *right rhombic prism*; but they are never used in medicine. It is entirely dissolved by its own weight of *distilled* water, and is also soluble in four times its weight of alcohol. When brought into contact with organic matters, it quickly decomposes them, and is itself converted into the black oxide. Upon this property is founded its use as a caustic. When exposed to light it is also decomposed, and converted into the black oxide. It ought, therefore, always to be kept from the light, which is usually effected by rolling it in paper. It is instantly decomposed by chlorine or soluble chlorides; and a solution of it is therefore constantly employed by chemists as a test for these substances. It is not deliquescent on exposure to air.

Composition.—Nitrate of silver is anhydrous, and consists of
1 eq. oxide of silver, $108+8=116$; 1 eq. nitric acid, 54
$=AgO,NO^5$; eq. 170.

Characters and tests.—White; it is dissolved by water. The solution throws down silver when copper is immersed in it; but after seventeen grains of nitrate of silver have been added to six grains of chloride of sodium dissolved in water, if more of the nitrate is dropped into the filtered solution, nothing more is thrown down. Access of light is to be shut out from it.

Nitrate of silver is not often extensively adulterated; but it may contain a trace of copper if the silver from which it is made is not quite free from it. It is frequently adulterated with nitrate of potash, which is fused along with it, and poured into the mould with it. The whole of the six grains of chloride of sodium is not precipitated by seventeen grains of the nitrate, unless the latter is quite free from impurity; if, therefore, any copper or potash is present, a further precipitate will take place on adding more of the solution of the nitrate. I have found the sticks of caustic which are sold as weighing ʒij or ℥ss very deficient in weight, by which a far greater loss is sustained than by any real or imaginary adulteration.

Substance for which it may be mistaken.—*Hydrate of potash* (caustic potash). Both are made into cylinders of similar size and appearance; but the potash is *very* deliquescent, and does not stain organic matters black; whilst this salt is dry, and blackens everything with which it comes in contact.

Medicinal properties.—*Externally*, *caustic*; *astringent*. *Internally*, *astringent* and *tonic*. It has always been in extensive use externally, but especially since the publication of Mr. Higginbottom's work. When applied solid to the moistened skin, or mucous membrane, it excites at first a slight sensation of heat, which soon becomes a severe burning pain. Though this pain is not, generally, nearly so severe as that occasioned by caustic potash, I have two or three times seen it almost cause fainting. If freely applied for a few minutes, it causes vesication in the course of two or three hours, and the cuticle becomes of a dark ashy or black colour; but more frequently the former, if it has been applied so as to cause vesication. It *very seldom*, if ever, causes the part to *slough*. When applied lightly to an inflamed or irritable surface, it frequently produces speedy relief; and in many cases, checks the further progress of the inflammation. When applied to the mucous membrane, it makes it white at first, by coagulating the mucus; and, if this is not removed, it ultimately becomes black.

Characteristics as a caustic.—Nitrate of silver blackens the skin; it is not deliquescent, and therefore does not spread beyond the surface which is rubbed with it; it generally causes less pain than other caustics, and seldom excites constitutional disturbance; but

Pereira saw one case, in which being extensively applied to the scalp of a child, it occasioned fever and delirium. It causes vesication, but not a slough, and frequently produces an eschar upon wounds, which acts beneficially by excluding the air.

Internal effects and uses.—Nitrate of silver frequently diminishes the fits in *epilepsy*, and sometimes cures the disease entirely. It has sometimes been useful in *chorea*. It acts favourably as an astringent in protracted *diarrhœa*, and is one of the best of that class of remedies. It allays irritability of the gastric mucous membrane, and thereby frequently relieves the intense pain of *gastrodynia*, when given in doses of gr. ss, combined with gr. ¼ of muriate of morphia, two or three times daily. It has effected the cure of *uterine leucorrhœa* in several cases, in some of which the patients complained of stomachic derangement, and not in the first instance of the leucorrhœa. When long taken it sometimes produces a blue colour in the skin, which cannot be removed by any means with which we are yet acquainted. It is carried by the circulation into the true skin, and is there decomposed, and gives the appearance described. The fear of this occurrence has often prevented the use of this remedy, but the risk is, probably, much exaggerated. Only a few instances are recorded, and, in these, it had been taken for a very long time. It is said, that it has never produced the blue colour under a three months' employment. When long used as an application to the eye, it sometimes produces a deep-brown stain of the sclerotic. Of this, I have seen several instances. It is said that the application of solution of iodide of potassium, by means of a camel's hair pencil, removes this stain; but I have not yet been able to put this to the test of experiment.

Externally.— Its uses are very numerous. In the *solid form*, or as a *caustic*, in *punctured wounds*. It should be cut to a point, and carefully introduced to the bottom of the wound, and the inflamed skin around should be just blackened by it. In *whitlow*, and *poisoned wounds*. Mr. Morgan frequently used it in the Eye Infirmary at Guy's Hospital for making an issue, by making a crucial incision over the temples, in *chronic ophthalmia*, and rubbing the caustic upon the under surface of the reflected flaps. In *stricture*, it has been used by introducing it into the urethra, at the end of a bougie. The practice is sometimes successful, but is hazardous, and not now often adopted. In *erysipelas*, a deep, broad ring is drawn with the solid caustic, beyond the margin of the inflammation; and sometimes puts a stop to its progress; but it frequently fails to do so. *Venereal* and *simple warts* are often cured by its use. *Porrigo* is very efficiently treated, by thoroughly rubbing the diseased patches; but, if it is extensive, only a portion at a time must be touched, lest it should cause severe constitutional irritation. In *chronic ophthalmia* caused by a *rough* and *granular condition of the palpebral conjunctiva*, it is often applied with success to the inner surface of the eyelids, after they have been scarified with a lancet. In these cases it is better to smear a little ointment of nitrate of silver (℈j or ʒj to an ounce of lard) over the inner surface of the everted eyelids, which may be easily done by taking a portion, the size of a large pin's head, upon the end of a silver probe, and passing it lightly over the granulations. The application of the solid caustic frequently causes cicatrices, which can be seen as white lines traversing the conjunctiva, and which sometimes act like tight bands, irritating the eye. The acute pain sometimes caused by it, requires the employment of anodyne fomentations. *Deep ulcers* of the *cornea* are sometimes touched with a pointed stick of caustic. *Chancres* may often be prevented from proceeding any further, if well touched to their base, on their first appearance. They then become a common sore, and must be treated accordingly. *Gonorrhœa,* in the female, is often safely cured in twenty-four or thirty-six hours by applying the solid caustic freely to the whole interior of the vagina. It causes little pain, and is perfectly safe. *Chronic* and *indolent ulcers*, with large flabby granulations, may be touched with this substance, and afterwards dressed with dry lint; if an eschar forms, so much the better: it must not be removed. Mr. Key's rule is, that *dry* indolent ulcers are best treated by the *vegetable stimulants*, such as resin ointment, &c.; but those *which discharge freely* are most benefited by *mineral* astringents, such as the nitrate of silver, &c. *Previous to the removal of a toe nail*, the moistened nail ought to be *freely* rubbed with this caustic, and in two or three hours a poultice should be applied. This makes the nail soft, and the next day, if the nail is again soaked in hot water, it can be dissected with ease from the subjacent tissues, *as far as the caustic has been applied.* By this means the horrible and barbarous operation of tearing out the nail, or a portion of it by force, may be entirely dispensed with. I can speak of this with confidence, having applied it thus in several instances. In a cracked and tender state of the skin surrounding the roots of the finger nails it gives relief, when lightly applied. In *spermatorrhœa*, or involuntary discharge of semen from self-abuse, it is applied to the prostatic portion of the urethra by means of a caustic bougie, or of an instrument specially contrived for the purpose.

In *solution*, it is applied in *acute purulent ophthalmia* of children. The mode of applying it in this disease is of great importance. Let the eye be gently opened, and syringed with lukewarm water. Then dip a camel's hair pencil into the solution, and, having taken up two or three drops, touch the *outer* angle of the eye. The drops will run from the brush across the eye to the inner angle, and be thus applied to the whole surface; if applied to the *inner* angle at first, they do little good. In *chronic ophthalmia* and in opacity of the cornea it is used, in a similar way, but a weaker solution is generally employed. In the *irritable* and *congested* state of the *throat*, sometimes present in *diabetes*, a strong solution (℥ss or ℈ij to f℥j) applied with a camel's hair pencil is useful, and in some degree allays the feeling of intense thirst. The same solution is one of the best applications to the throat in cynanche, acute or chronic. In *hooping cough* a solution of gr. xv in f℥j of water, has been applied with great reported advantage to the pharynx and glottis by Dr. Eben Watson in the manner to be immediately described. He applied it every other day, and even in severe cases the hooping ceased in a week or ten days, and the other distressing symptoms also abated.* In what has been termed "*follicular disease of the larynx*" (the description of which would be foreign to the nature of this work, but which is highly important from its influence in aggravating, if not originating many cases of phthysis), Dr. Horace Green, of New York, proposed the application of a still stronger solution (℈ij or ℈iv in f℥j) to the pharynx, glottis, and ultimately the larynx, and this plan of treatment has proved of great service in many cases. "The method of applying the solution is by means of a globular piece of sponge, the size of a small cherry, fixed to the end of a curved whalebone like a probang. With this the aperture of the glottis is passed, but only after some manipulation, accustoming the part to the contact of the instrument by applying the solution to the outside of the rima glottidis for several days in succession. In this way the exquisite sensibility of the glottis is overcome, and the sponge can then be passed through it without difficulty." † The employment of the sponge in this manner is, however, by no means easy, and the same benefit has been obtained by injecting a weaker solution (℈j or ℈ij in f℥j) upon the pharynx, glottis, and into the larynx by means of a syringe with a bent pipe, (Dr. T. Thompson, quoted by Dr. Turnbull ‡). Dr. Bryan has also reported favourably of its employment in a similar manner in the treatment of *membranous croup*, in a case which presented an almost hopeless aspect. The strength used was at first ℈ij to the ounce, and then ʒj. It was twice introduced into the pharynx at an interval of two hours, and afterwards at intervals of twelve hours.§ In *chronic* and *irritable ulcers*. In *pruritus ani*. In *cracked nipples*. In this case, the nipple should be carefully dried immediately after the child has ceased sucking, and the lotion should be applied. It has plenty of time to dry, before the reapplication of the infant. It is applied to *enlarged tonsils* (ʒj to f℥ss) with a brush. As an *injection* (gr. x to f℥iv of gruel) in *chronic dysentery*, it sometimes affords much relief. In *superficial ulcers* on the glans penis and inner surface of the prepuce, a *weak* solution is the best treatment.

Antidotes.—Chloride of sodium (common salt). It forms an insoluble chloride of silver. An emetic may be given afterwards.

Dose.—For *internal* administration, from ⅙ to ½ gr., gradually increased to gr. ij or gr. iv. It has been given in as large a dose as gr. xv, but when using it in the treatment of gastrodynia or diarrhœa, in doses of even gr. ss. I have several times been obliged to reduce it to gr. ¼, from the symptoms of irritation excited by the larger dose. It may be safely continued for two or three months. It is usually made into pills with bread crumb, but a little sugar should be added to prevent them from becoming too hard. Confection of roses, or some soft extract, is a better substance still; but they should never be made long before they are used, and should only be prepared by a few at a time. It ought never to be given in solution.

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* Ranking's Abs. vol. xi. p. 194.

† Ibid. vol. vi. p. 222.

‡ Report on Consumption, 1853, p. 54.

§ Braith. Rct. vol. xix. p. 373.

For *external* use. In acute purulent ophthalmia gr. x in f℥j of *distilled* water, is usually employed. It ought not to be weaker than this in the *acute* stage; but, in the chronic state, from gr. ij to gr. v in f℥j is as much as can generally be borne with advantage. Its application causes temporary acute pain. For most cases in which it is used as a lotion, gr. ij to gr. v to f℥j is the best strength. It sometimes happens that cases of chronic ophthalmia are not benefited, but rather appear to be aggravated by the latter lotion. When this is the case, reducing the quantity of nitrate of silver will generally produce satisfactory effects.

Incompatibles.—It is decomposed by so many substances, that it ought never to be dissolved in anything but *distilled* water; and as it is decomposed by light, the bottle containing the solution should be surrounded with paper, and ought *never* to be *placed near the window* of the patient's room. It is decomposed by all organic matters, and therefore should not be prescribed with rose water, or mucilage, or any organic substance. Nevertheless, Mr. Guthrie's ointment of nitrate of silver is a very useful formula, but some of the caustic is decomposed in it, and the ointment acquires a dark colour.

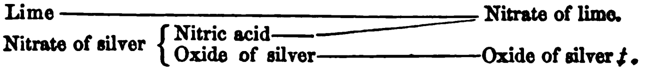
ARGENTI OXYDUM, *D.*

OXIDE OF SILVER.

Take of Nitrate of silver, half an ounce.
Lime-water, four pints, or a sufficient quantity.
Distilled water, half a pint.

Dissolve the nitrate of silver in four ounces of the water; mix it with the lime-water, agitate well together; set aside, that the precipitate may subside; decant the supernatant liquid, and wash the precipitate on a filter with the remainder of the water. Dry it at 212°, and keep it in a bottle.

Process.—In this process, the lime combines with the nitric acid of the nitrate of silver, and forms nitrate of lime, whilst the oxide of silver is precipitated.



Medicinal properties and uses.—Numerous statements have been made to the effect that oxide of silver acts more beneficially in gastrodynia and in chorea than the nitrate; and this preparation has accordingly been introduced into the Dublin Ph. In *menorrhagia* and *too frequent menstrual discharge*, it has been employed [illegible] Dr. B. Lane and Sir J. Eyre, and more recently [illegible] written strongly in its favour. The cases most [illegible] are those unaccompanied by high inflammatory [illegible] attended with pyrosis, gastrodynia, and all the nervous [illegible] profuse or too frequent menstrual discharge brings [illegible] many cases the nervous excitement is allayed by it, the [illegible] symptoms disappear, and the discharge is reduced to its [illegible] amount and its natural frequency. In long-continued dis[illegible] after confinement it is also of service. Where organic disease [illegible] inflammation is present, the oxide of silver produces no benefit. [illegible]'s dose is gr. ss to gr. j, two or three times a day, combined with a little opium or morphia. Oxide of silver blackens the stools. (Ranking's Abs. vol. x. p. 330.) It has also been found of service in the *diarrhœa* of phthysis.

Dose. — Gr. j to gr. ij or gr. iij, with some soft extract; and, if necessary, a little muriate or acetate of morphia.

PRÆPARATA EX ARSENICO.

PREPARATIONS OF ARSENIC.

ARSENICUM.

Arsenic. *Symb.* As. Eq. 37 formerly; 74 at present.

Remarks. — Arsenic is a grey, crystalline, brittle metal, of sp. gr. 5·884; when broken, it has considerable brilliancy. It is more volatile than arsenious acid, subliming at 365° F, and it does not melt previous to subliming.* It rapidly oxidises whilst in the state of vapour, if air is present, and is converted into arsenious acid. The odour of the volatilised *metal* resembles that of garlic or phosphorus. It combines with oxygen, in two proportions; with the first, forming arsenious acid ($As\,O^3$), which is employed in medicine; and with the second, forming arsenic acid ($As\,O^5$) which is not used medicinally. The metal itself is obtained by heating arsenious acid with charcoal, by means of which the oxygen is removed, and flies off, combined with carbon, as carbonic acid, and the metal sublimes and is condensed in a cool part of the apparatus.

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* Though I have copied this statement from works on chemistry of acknowledged authority, I suspect that there is some inaccuracy in it; for I have always observed that, in removing a ring of arsenic from the interior of a test tube, the heat of a spirit lamp has been required for a longer time before volatilisation has *commenced* than has been the case when experimenting upon a similar ring of arsenious acid, the subliming point of which is stated to be higher than that of arsenic.

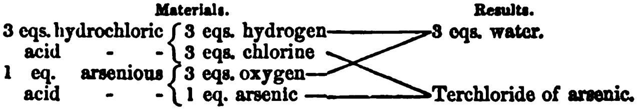
LIQUOR ARSENICI CHLORIDI, *L.*

Solution of Chloride of Arsenic.

Take of Arsenious acid, broken into pieces, half a drachm.
Hydrochloric acid, a fluid drachm and a half.
Distilled water, a pint.

Boil the arsenious acid with the hydrochloric acid, mixed with an ounce of water, until it is dissolved; then add as much water as may be sufficient that it may exactly fill a pint measure.

Process.—In this case, both the acids are decomposed; the hydrogen of one combining with the oxygen of the other, to form water, whilst the chlorine combines with the arsenic, to form terchloride of arsenic, which is dissolved by the water.



Medicinal properties and uses.—The same as those of liquor potassæ arsenitis; but it is said to be less liable to disorder the stomach and bowels.

Dose.—Each fluid ounce contains 1¼ grain of arsenious acid. It is therefore about a third of the strength of liq. potas. arsenitis. *Dose*, ♏x to ♏xxx. It should be commenced by a few drops at a time, and gradually increased daily, until the desired quantity is taken. It ought not to be taken upon an empty stomach.

ARSENICI TERIODIDUM. (Not Off.)

Teriodide of Arsenic, more commonly called Iodide of Arsenic.

Take of Iodine, 378 grains.
Arsenic (metallic) powdered, 75 grains.

Rub them intimately together; then place them in an alembic, and sublime by heat. Or

Take of Iodine, 378 grains.
Powdered metallic arsenic, 80 grains.
Water, 10 fluid ounces.

Boil them together in a flask until the deep colour of the iodine disappears, then filter the solution, evaporate to dryness, and sublime the residue.

Process.—This is a case of simple combination, whichever mode is adopted, and the reason for directing more arsenic in the second than in the first method, is to insure a sufficiency of arsenic, the slight excess which is ordered being afterwards separated by the filtration.

Characters.—Teriodide or iodide of arsenic is in orange-red needle-shaped crystals, volatile by heat, and soluble in water.

Composition.—1 eq. arsenic, 75 + 3 eqs. iodine 126 × 3; 378 $= AsI^3$ eq. 453.

Medicinal properties and uses.—Iodide of arsenic is a very powerful alterative, and is only used in small doses. It was recommended by Dr. A. T. Thomson in the treatment of *lepra* and *impetigo*, and other obstinate skin diseases; and it has been useful in *lupus*, when applied as an ointment. It has been employed in *cancerous affections*, both real and apparent, and the following is Dr. Walshe's summary of its effects. The cases were all scirrhus of the breast, and ulceration had not commenced, though the constitution was seriously affected. In most of the cases other treatment was adopted at the same time, but of a less energetic character.

1st. The iodide of arsenic is well borne, and may be safely continued for months in doses of gr. $\frac{1}{16}$ to gr. $\frac{1}{12}$ twice a day, if taken an hour after eating.

2nd. It soon produces perspiration with dryness of the fauces, and sometimes, though rarely, slight headache.

3rd. The pain in the tumour diminishes in violence, and the size of the breast generally diminishes; and even if the tumour itself does not lessen in size, its growth, though formerly increasing, becomes as far as can be determined suspended, and the general health improves.

4th. His experience does not enable him to say what power this medicine, unaided, may possess of removing scirrhous tumours, because he invariably, after a short trial of it alone, associated external agents in treatment along with it.*

Dose and administration.—Gr. $\frac{1}{16}$ or gr. $\frac{1}{12}$ twice a day if it is to be continued for months, or if a shorter trial only is intended, it may be gradually increased to gr. $\frac{1}{8}$. It is made into pills, and should be taken shortly after a meal.

LIQUOR POTASSÆ ARSENITIS, *L. D. E.*

SOLUTION OF ARSENITE OF POTASH.

Synonyme. Liquor Arsenicalis, *D. E.* Fowler's Solution.

Take of Arsenious acid, broken into small pieces,
Carbonate of potash, each, eighty grains (gr. lxxxii avoir. *D.*).
Compound tincture of lavender, five fluid drachms (f℥ss, *D.*).
Distilled water, a pint.

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* Walshe on Cancer, 1846, pp. 201, 202.

Boil the acid and carbonate with half a pint of the water, until they are dissolved. Add the tincture to the cooled liquor; add lastly, as much water as may be sufficient that it may exactly fill a pint measure.

Strength. — This solution contains four grains of arsenious acid in the fluid ounce.

Process and decompositions. — When arsenious acid is boiled with carbonate of potash, the carbonic acid is displaced, and flies off as gas, leaving the potash combined with the arsenious acid. This compound (arsenite of potash) is readily soluble in hot or cold water. The tincture of lavender is added merely for the sake of colour and taste.

The arsenious acid sold *in powder* is generally much adulterated with sulphate of lime (plaster of Paris, or gypsum), which is not soluble in the solution of carbonate of potash. It should not be employed for this process, but that which is in cakes or masses should be used. The arsenious acid by itself is not readily dissolved in water, but the addition of the carbonate of potash causes its solution in a few minutes. If the suspected arsenious acid is heated on platinum foil, anything which remains unsublimed is an impurity.

Properties of arsenious acid. — It occurs in colourless pieces, which are usually opaque externally, but semi-transparent internally when fresh broken, and somewhat resembles milk-white or yellowish glass. It has scarcely any taste or smell, and is highly poisonous. Its sp. gr. is 3·7. It is volatile at 380° F., and its vapour does not possess the odour of garlic, though sometimes said to do so. It is the vapour of metallic arsenic which has this odour. A thousand parts of water at 60° dissolve very little arsenious acid; the quantity is variously stated at from one part to ten, and the opaque acid is more soluble than the transparent kind. A thousand parts of boiling water dissolve, according to different chemists, from seventy-eight to ninety-seven parts of the transparent, or one hundred and fifteen of the opaque variety. Of this quantity, from eighteen to thirty-two parts are retained in solution when it is cold. The remainder is deposited in octahedral crystals. The presence of tea, or any organic matter, interferes very much with the solubility of arsenious acid.

Composition. — Arsenious acid is a teroxide, and consists of

1 eq. arsenic, 74; 3 eqs. oxygen, 24=AsO^3; eq. 98.

Characters and tests. — White or slightly yellowish; generally opaque, but sometimes when it is freshly broken, it is more or less permeable by light; when heated in a glass tube, it is sublimed of a white colour; after a time, it changes into colourless octahedral crystals, when it has cooled. Mixed with charcoal

and exposed to heat, it is reduced to (metallic) arsenic, and is sublimed, exhaling an odour of garlic; afterwards, when it has cooled, it adheres to the tube, shining like a metal. It is dissolved in boiling water, from which it (partially) descends in octahedral crystals, when it cools. This solution throws down a *yellow* precipitate when *hydrosulphuric* acid is added; a *citron* (yellow) precipitate when *ammonia* and afterwards *nitrate of silver* are added, and a *green* one when *potash* and *sulphate of copper* are added. If 100 grains of this acid are boiled with dilute hydrochloric acid, and hydrosulphuric acid is transmitted, when it has become cool, 124 grains of (ter-)sulphuret of arsenic are thrown down.

Tests.—*Liquid.*—*Sulphuretted hydrogen*, HS, causes a *yellow* precipitate of tersulphuret of arsenic, AsS^3, or *orpiment*, which is soluble in potash or ammonia, or in excess of the gas itself.

Ammoniacal nitrate of silver causes a sulphur-*yellow* precipitate. This test is prepared by dropping solution of ammonia into solution of nitrate of silver, until the precipitate at first formed is nearly redissolved. Nitrate of silver, by itself, does not produce a precipitate with arsenious acid; for the arsenite of silver which is formed, is instantly redissolved by the nitric acid which is separated from the silver. The ammonia is therefore added, to neutralise the nitric acid, and enable the yellow precipitate of arsenite of silver to fall down.

Ammoniacal sulphate of copper produces a bright green precipitate (*Scheele's green*) of arsenite of copper. This test is prepared from sulphate of copper, in the same way as the last from nitrate of silver; and with the same view, viz. to prevent the sulphuric acid, which is set free, from dissolving the precipitate of arsenite of copper.

Reduction test.—If a small portion of *arsenious acid* is mixed with finely powdered *charcoal* and put into a small test tube, and carefully heated over a spirit lamp, the arsenious acid is decomposed. The oxygen combines with the carbon, and flies off as carbonic acid, and the metallic arsenic is at the same time volatilised and condensed in a cool part of the tube, where it forms a dark shining ring in the interior.

If the substance operated upon is *tersulphuret of arsenic* (the precipitate formed in the first experiment), instead of arsenious acid, then black (*potash*) or white (*soda*) *flux* must be used instead of simple charcoal. The potash or soda is necessary to remove the sulphur from the compound. Sulphuret of potassium or sodium is formed, and the metallic arsenic, which is set free, is sublimed as before. In this case, the whole of the arsenic cannot be removed; for some of it remains combined with the sulphur and potassium in the tube. If the portion of tube which contains the ring of arsenic is now cut off, and introduced into a larger tube and heated, it will become perfectly clean again. Upon the interior of the larger tube, a ring of minute white shining crystals will be formed at the same time. Here the metallic arsenic has been again volatilised, and has left the first tube clean; but whilst in the state of vapour, it has combined with the oxygen of the air in the larger tube, and been reconverted into arsenious acid; which, being condensed upon a cool part of the tube, has formed the white ring of minute crystals.

Marsh's test.—This is by far the most celebrated of the tests for arsenic; and no judge would consider that an examination had been properly conducted, if its employment had been omitted. The reduction of the arsenic by this test depends upon the influence of hydrogen gas, at the instant of its formation (nascent) upon the element in combination with the arsenic.

In using Marsh's apparatus or any modification of it, the suspected liquid is mixed with diluted sulphuric acid (1 part to 6 or 7 of water). A piece of zinc is put into the short leg of the tube, and the mixed liquid is then poured into the long leg. As soon as the hydrogen begins to form, part of it removes the sulphur, oxygen, or other body combined with the arsenic, whilst another portion combines with the liberated arsenic, forming arseniuretted hydrogen gas. As soon as the air which was previously contained in the tube is expelled, the gas must be inflamed, and a plate of mica, glass, or white porcelain held close above it. The gas burns with a peculiar bluish-white flame, and if much arsenic is present, emits a white smoke. The hydrogen is consumed, and forms water with the oxygen of the air, whilst the metallic arsenic is deposited upon the cold surface opposed to the flame. The white smoke consists of arsenious acid, caused by the combination of some of the arsenic with the oxygen of the surrounding air. In the centre of the plate, exactly over the flame, there is a dark brownish-black spot of arsenic, which is surrounded by a glistening hair-brown, larger ring, external to which is a white ring of arsenious acid. The greater the distance from the flame at which the plate is held, the larger will be the proportion of arsenious acid, owing to the quantity of air through which the volatilised arsenic must pass, which rapidly converts it into arsenious acid. If the stains are formed upon white porcelain, the white ring of arsenious acid cannot be discerned. The simplest form of this apparatus consists of a quinine bottle with a glass tube passing through the cork, and terminating in a fine jet. The zinc and suspected fluids, previously acidulated with sulphuric acid, are introduced into the bottle, and the gas is ignited as it issues through the jet.

In *fig.* 2. is represented a modification lately proposed by a commission appointed by the Prussian government. The object in using this apparatus is to avoid loss, but chiefly to ascertain the actual *weight* of arsenic present. Arseniuretted hydrogen is formed as above, and passes through the stop-cock and along the tube, till

Fig. 1.

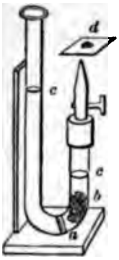

Fig. 2.

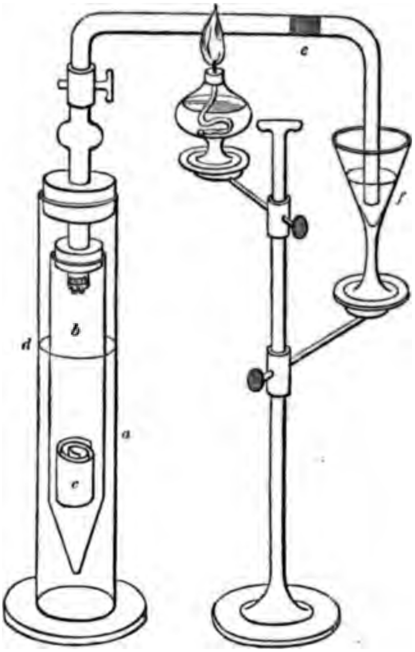

Fig. 1. — MARSH'S APPARATUS.

a, Piece of glass, in the short leg, to prevent the zinc from falling out of it.
b, Zinc.
cc, Dilute sulphuric acid, and the suspected compound.
d, Cold plate of glass or porcelain.

Fig. 2. — MODIFICATION PROPOSED BY A PRUSSIAN COMMISSION.

a, Glass vessel loosely closed by a cork, containing an interior glass vessel.
b, Interior vessel, open at bottom, air-tight at top, in which a glass tube is fitted. It contains zinc.
c, Zinc.
d, Dilute sulphuric acid and suspected compound.
e, Arsenical crust in the cool part of the *hard German* glass tube.
f, Glass containing solution of nitrate of silver.

it reaches the heated portion. Here it is decomposed by the heat: the hydrogen passes on, and the arsenic, reduced to the metallic state, collects in the cool part of the tube beyond the flame. This portion of the tube can be cut off and weighed, and again weighed after the arsenic is driven off by heating it. The loss of weight shows the quantity of arsenic deposited. As some of the gas may have escaped decomposition, it is made to pass through a solution of nitrate of silver, by which the gas is converted into arsenious acid, and metallic silver is precipitated. After the whole of the remaining silver has been removed by chloride of sodium, sulphuretted hydrogen may be passed through the solution, and the tersulphuret of arsenic collected and weighed.

Galvanic tests. — To avoid all fallacy from the accidental presence of arsenic in the zinc required in Marsh's test, the arseniuretted hydrogen may be obtained by means of galvanic decomposition. The suspected fluid is to be introduced into distilled water, acidulated with *pure* sulphuric acid to make it a better conductor, and the gas evolved at the negative pole will be hydrogen combined with any arsenic which may be present; this gas is then to be inflamed, as in Marsh's test. This test is however so complicated, that it is never used in real cases, as every purpose gained by it is equally answered by first ascertaining the purity of the zinc and acid used in Marsh's test. The necessity for this caution may be seen by referring to p. 109.

Reinsch's test will probably supersede most of the others, as it is exceedingly delicate, and remarkably easy of application. The suspected fluid is put into a test tube, and a slip of *bright* copper is then introduced. To the liquid is then added a little hydrochloric acid (ʒj), and the whole is *boiled*. If arsenic, in *any* form, is present, it begins to be deposited upon the surface of the copper as soon as ebullition commences, and this acquires a coating, which varies in its appearance with the quantity of arsenic present. If it is very small (gr. $\frac{1}{500}$ to gr. $\frac{1}{300}$), the surface of the copper becomes bright grey, resembling polished iron; but if the quantity is larger (gr. $\frac{1}{100}$ to gr. $\frac{1}{50}$), it becomes dark brown or grey without any lustre; if the quantity is large (gr. $\frac{1}{10}$ to gr. $\frac{1}{2}$), the copper appears white, as if plated with tin or silver. The copper should now be removed, carefully dried in blotting-paper, or very cautiously over the flame of a spirit lamp, and should then be introduced into a small test tube. Upon applying the heat of a spirit lamp, the copper gradually resumes its natural colour, but does not regain its polished surface; and a ring of white arsenious acid is formed upon the cool portion of the tube. The advantage of this test is, that the presence of complicated or coloured organic matter does not interfere with its employment. In this case, hydrogen is again the reducing agent. At the temperature of ebullition the hydrochloric acid is decomposed; its chlorine combines with some of the copper, and the liberated hydrogen decomposes the arsenious compound, and removes the body in combination with the arsenic, which is then deposited upon the surface of the copper, and gives it a dark or plated appearance, as there happens to be more or less arsenic present. When the plated copper is afterwards heated in a test tube, the volatile arsenic is driven off, and is deposited either as a dark metallic ring upon the interior of the tube, or as a white ring of arsenious acid, if it has been converted into this by the air in the tube.

Fallacies. — If all these tests answer, the evidence is perfectly conclusive, as no known substance is thus influenced except

arsenic. But each test, taken separately, is liable to objections, which must be remembered and guarded against.

Objections.	Answers.
Ammoniacal sulphate of copper.— A decoction of nux vomica causes a green precipitate with this test. The presence of many organic compounds either prevents the action of this test, or so changes its effects, as to render it of no value.	Both these objections are true; and therefore this test, taken alone, is not at all conclusive as to the presence or absence of arsenic.
Ammoniacal nitrate of silver. — If the test is not very carefully made, there may be a precipitate of yellow phosphate of silver, if a soluble phosphate is present in the solution under examination.	If the test is carefully prepared, there is no precipitate from a soluble phosphate; for the ammonia dissolves it as fast as it is formed.
Chlorine or a soluble chloride may give a precipitate which will look yellow in a liquid coloured yellow by any organic substance.	All the chlorine may be previously removed by the addition of nitrate of silver, which precipitates chlorine, but does not precipitate arsenious acid.
The presence of some coloured organic matters prevents the formation of the yellow precipitate or changes its colour.	This is true; and hence arsenic may fail to be shown by this test, even when it is present. But if, when carefully employed, a distinct yellow precipitate is formed, it is not open to any known objection.
Sulphuretted hydrogen. — A soluble salt of cadmium produces a yellow precipitate with hydrosulphuric acid, which is volatile, and is reduced by the soda flux.*	Sesquisulphuret of arsenic is soluble in ammonia. Sulphuret of cadmium is not soluble in ammonia. Sulphuret of arsenic is not soluble in hydrochloric acid. Sulphuret of cadmium is soluble in hydrochloric acid. Arsenious acid is not precipitated by hydrosulphate of ammonia, which a salt of cadmium is. A salt of cadmium does not precipitate cadmium upon copper, when boiled with hydrochloric acid (*Taylor*).
A bisalt of tin produces a yellow precipitate with hydrosulphuric acid.	This precipitate is not soluble in ammonia, and it is not reduced by the soda or potash flux.
Reduction. — The dark stain on the interior of the tube may be owing to the reduction of the lead	If the stain is dependent upon lead in the glass, it will not disappear on cutting the tube off and

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* I believe this statement to be quite untrue, if it is meant that sulphuret of cadmium is reduced and is volatilised by the heat of a spirit lamp in a common test tube. At any rate, I have never succeeded in subliming it. (J. B. N.)

Objections.	Answers.
contained in the glass of which the tube is made.	heating it in another larger one; nor will a white ring be formed in that larger tube, as will be the case if the stain is arsenical.
Or to charcoal, mechanically carried up the tube by the heat.	The interior of such a crust is rough and powdery, not shining and crystalline; and the ring is not converted into the white ring of arsenious acid when again heated.
Marsh's test. — The zinc or sulphuric acid employed may contain arsenic.	Ascertain their purity before using them.
Antimony, tellurium, selenium, iodine, bromine, phosphorus, and sulphur, all produce a stain upon glass, when treated by this method.	Antimony is the only known substance, which produces a stain at all resembling the dark spot of arsenic, surrounded by the exterior white crust. There are decided and characteristic differences between the colour of the two flames; but these are not easily intelligible from description, nor are they conclusive distinctions. If a drop of hydrosulphuret of ammonia, with excess of sulphur, is placed upon an antimonial stain, it begins to dissolve instantly, and in less than a minute disappears. An arsenical stain is at first scarcely affected at all; but after a considerable interval it diminishes, but is never entirely removed by a single application of the test. On evaporating the excess of hydrosulphuret, a spot remains. If this is antimonial, it is unaffected by a drop of liquor ammoniæ, but disappears on the application of hydrochloric acid. If it is arsenical, it is dissolved by ammonia, but unaffected by the acid.* If a drop of nitric acid is placed upon the suspected spot, and evaporated to dryness, a white powder will be left. If this is arsenious acid, a yellow precipitate will be formed, on adding a few drops of dilute solution of nitrate of silver and exposing it to the fumes of ammonia, upon a glass rod. If it had been converted into arsenic

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* Guy in Ranking's Abs. vol. vii. p. 346.

OBJECTIONS.	ANSWERS.
	acid by the nitric acid and heat, a brick-red precipitate will be formed on the addition of the nitrate of silver. None of these effects are produced if the spot has consisted of an antimonial deposit. The arsenical spot is removed by heat. The antimonial one is not removed by heat. Arseniuretted hydrogen, when inflamed and directed upon a drop of ammonio-nitrate of silver, produces a yellow precipitate. Antimoniuretted hydrogen does not produce a yellow precipitate when so treated.
Reinsch's test. — Antimony, tin, and lead produce a dark or silvery deposit upon copper, when boiled with hydrochloric acid.	Tin and lead are not volatile; but if the stain is owing to antimony, the copper does regain its red colour when heated, but no white ring of crystalline particles is formed in the cool part of the tube in which it is heated, by which it is distinguished from arsenic.

Impurities. — Arsenious acid in powder is frequently adulterated with chalk or sulphate of lime (plaster of Paris). This is easily detected by the powder which remains unsublimed when the arsenious acid is heated. The arsenious acid in cakes is generally pure.

Incompatibles. — Acids, or acidulous salts; lime-water; earthy or metallic salts; sulphur, and preparations of cinchona.

Medicinal properties. — Applied *externally*, arsenious acid acts as a *caustic.* When taken *internally* in very small doses, it produces little obvious effect, though some writers think it to be *tonic.* If long continued, even in small doses, it causes pain or uneasiness in the stomach, purging and griping, thirst, and dryness of the throat and skin, stiffness of the face and eyelids, injection of the conjunctiva, and general languor. I have observed that without any other symptoms of its action, the heart has become very excitable, jumping into bed or running up stairs being sufficient to raise the pulse to above 100. On one occasion, after its moderate use (♏x, twice a day) had been continued for about two months, the patient was seized with a sudden attack of great dyspnœa, and pain under the sternum and quick pulse, which continued from 2 A.M. to 8 A.M., and then subsided considerably, but returned with their previous violence the next morning at the same hour, and continued about four hours. Leeches over the præcordia and free purging were employed, and the next day the patient was free from unpleasant symptoms. One or two cases of paralysis following the employment of still smaller doses have been recorded; but when our experience is limited to one or two instances, as in the above cases, it is always uncertain what connection there has been between the medicine and the subsequent affection. A peculiar eruption, eczema arsenicale, sometimes occurs, and salivation is occasionally produced. In large doses, it is a deadly poison.

Characteristics of poisoning by arsenic.— Little or no perceptible taste when swallowed. In a short time (15 to 30 minutes), vomiting and purging of blood come on, with violent burning pain in the epigastrium, increased by pressure; sometimes violent thirst, and at other times inability to swallow; feeble irregular pulse; skin, cold and clammy, though sometimes hot; respiration difficult, from the tenderness of the abdomen; coma, or sometimes slight convulsions, precede death. In some rare cases, the pain, vomiting, and diarrhœa have been very slight or entirely absent; and narcotism and convulsions have been the prevailing symptoms.

Death usually occurs in from twenty-four hours to three days. It has often happened so early as four or six hours after the poison has been swallowed; and in one case, in two hours.

Post-mortem appearances.— Intensely deep red inflammation of the stomach, becoming brighter on exposure to the air, frequently the most decided in the large extremity. The duodenum and rectum are also frequently much inflamed. The mucous membrane of the stomach is frequently ulcerated, and small fragments of arsenious acid are found firmly imbedded in tenacious mucus. It is, however, asserted that ulceration is not nearly so common as is generally supposed.* Perforation is very rare. Inflammation is present in the stomach, in whatever way the poison has been introduced into the system. From this it would appear that arsenic exerts a specific influence upon the stomach. Arsenic may generally be detected in the liver, even when the patient has survived so long that it has entirely passed out of the stomach and bowels; but though it appears thus to take up its residence in this organ, it is gradually but continually eliminated by the kidneys; which fact supplies an important indication of treatment, by pointing out that we should employ diuretics to remove this poison from the system, in cases in which it is producing injurious effects, either from a poisonous dose which the patient has survived, or from having been used medicinally for too long a period.

The lungs and bronchial mucous membrane are sometimes congested; and the blood is occasionally fluid after death, and dark coloured. But these effects are not generally observed.

Effects upon the dead body. — It seems to be fully established that arsenic retards the process of putrefaction, and that it may be detected in the decaying remains of the body for many months after death. The skin shrivels up and dries, and the flesh becomes converted into a greasy "adipocerous" mass, instead of being entirely decomposed. The body exhales an odour of garlic during the process, and the arsenic slowly, and but slowly, disappears from the body.†

Antidotes.—If vomiting is not present, the stomach-pump should be used; and milk, or oily draughts should be given to envelop the particles of the poison, and assist the vomiting. Flour and water may be given. The hydrated sesquioxide of iron is in the greatest repute at present. It is prepared by adding solution of ammonia to a solution of persulphate of iron, and washing the precipitate. It may be prepared extemporaneously by precipitating the tincture of sesquichloride of iron by solution of ammonia. The persulphate of iron may be made by boiling solution of sulphate of iron with one-sixth of its weight of sulphuric acid, and adding nitric acid in successive portions, until nitrous acid fumes cease to be evolved. Twelve parts of this are requisite for neutralising one part of arsenious acid; but as the quantity of poison in the stomach is always uncertain, it should be given in doses of a table-spoonful every five or ten minutes, until some amendment is produced. A great number of eminent chemists have experimented upon this antidote, and have arrived at satisfactory results. On the other hand, Dr. Brett[*], Mr. Orton[†], and Dr. Taylor[‡], have not found that it has had the power of removing arsenious acid entirely, even when it was in solution; and have observed very little effect indeed upon the poison when merely mechanically divided. The weight of testimony is, however, decidedly in favour of the antidote, which it is therefore our duty to use until a better is found.

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* Taylor's Med. Jurisprud.

† Christison, Toxicology.

After having attended in this way to the most urgent part of the treatment, we ought next to employ diuretics in order to remove from the system such portions of the poison as may have been carried into the circulation, in accordance with the observation already made, that the kidneys are the grand organs by which this substance is eliminated from the system.

Another substance, viz. magnesia, is now coming into vogue again as an antidote, in cases of poisoning by arsenic, and there is not wanting testimony in its favour. It was in use as an antidote thirty years since, and then went out of fashion, and out of use. It possesses the advantage over the peroxide of iron, of being more easily obtained, and its employment in large quantities should not be omitted, if the iron is not at hand.

Medicinal uses.—In *intermittent fever* arsenic is a very valuable remedy, and sometimes answers when cinchona or quinine has failed. It is not however, generally, so valuable as the latter. It may be given even during the febrile paroxysm, and should be taken three or four times daily. If necessary, on account of irritability of the bowels, opium should be conjoined with it.

Periodical headaches and *intermittent neuralgias* are frequently relieved by its use. Dr. Henry Hunt says that it is the most useful in this latter disease when it occurs in weakly, languid, anæmiated people. When the patient is plethoric, and has a furred or bright red tongue, it is almost certain to disagree. He combines it with T. camph. co. ♏ij or ♏iij, with each dose. It frequently does good in *chorea*. It is a most valuable remedy for *lepra*, *psoriasis*, *eczema*, and *impetigo;* especially for the first two, and is the basis of the celebrated Lignum's antiscorbutic drops. In *chronic rheumatism* with pains in the bones; in *venereal nodes* and in *passive dropsies* it is also said to be sometimes useful.

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[*] Lond. Med. Gaz. vol. xv. p. 220.
[†] Lancet, Nov. 8. 1834, p. 232.
[‡] Med. Jurisprud.

In cases of *hay-fever*, partaking of a catarrhal rather than an asthmatic character, Dr. Mackenzie has found it useful in doses of about ♏v of Fowler's solution, three times a day. In slight cases he prefers a smaller dose, but a larger one in obstinate attacks.

"On the 11th July it was commenced in ♏v doses of Fowler's solution, and by the 16th nearly every vestige of the complaint had disappeared. The patient, however, was so sceptical in regard to medicine, that he was unwilling to attribute his improvement to it. 'The disease had worn itself out,' &c. The following year I had an opportunity of trying it, in several cases, and in all with encouraging success;" and he mentions other practitioners who have used it with success at his suggestion.[*] As an antidote to the effects of snake bites, arsenic has lately attracted attention, and five cases are reported by Mr. Ireland, in which fʒii of Liq. Potas. Arsen. and ♏x of Tr. Opii being given every half hour, until vomiting and purging were produced, all the patients recovered.[†] The dose appears large and hazardous, but it is reported to have been both safe and beneficial; and the malady for which it is prescribed being an urgent one, we are certainly justified in recommending further trials of it in such cases.

In *cancer*, it has acquired a high reputation, but is now very seldom used, as it has caused death in some instances. In cancer of the uterus, small doses (♏iij to ♏x, ter quotidie) sometimes relieve the pain more than morphia or the other common narcotics; and in these doses it is frequently very useful in atonic menorrhagia.[‡] Made into an ointment with iodide of potassium (ʒss of each, to ℥j of lard), it has been used to remove *venereal warts* upon the glans penis, and in other parts: but very severe sloughing is sometimes produced by it. Arsenic occasionally produces good effects in *lupus*, and *noli-me-tangere*, when other things have failed; Sir A. Cooper prescribed ʒj of arsenious acid and ʒj of sulphur, to ℥j of lard or spermaceti ointment, to be applied on lint for twenty-four hours, and then removed; the sore which remains, on the separation of the slough, must be treated with simple dressing. It appears as if arsenious acid acted differently from other caustics, in not simply removing the diseased portion, but in also exciting a new and peculiar action. In *onychia maligna* an ointment of gr. ij to ℥j is almost a specific.[§]

Administration and doses.—Arsenious acid may be given in powder or solution. It does not always produce the same effects in these two forms, appearing sometimes to act most favourably when solid. The dose of the powder is from gr. 1/16 to gr. 1/8, very finely divided by means of sugar, and made into pills with some soft extract. Of the solution, the dose varies from ♏iij to ♏v or ♏xx. It should always be small at the commencement, and should never be taken except after a meal. It is sometimes given to the extent of ♏xxx, three times daily; but more than ♏x or ♏xii can seldom be long continued with safety. It may be given for many weeks, but should be carefully watched, and intermitted or suspended if unpleasant symptoms begin to appear. It is probable that every advantage likely to be obtained from it will be gained by the last-mentioned dose, and that increasing this will only have the effect of retarding the progress of the case, by causing irritation or general debility.

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[*] Braith. Retrosp. vol. xxiv. p. 16.

[†] Ib. vol. xxviii. p. 422.

[‡] Hunt and Locock, Lancet, 1837-38, vol. ii. p. 93.

[§] Pereira, Mat. Med. p. 647.

Poisonous doses.—The smallest recorded doses have been 30 grs. to an adult, and 4½ grs. to an infant. In two or three cases, 3 grs. have produced very severe and dangerous effects, and in some fatal cases the quantity was not known with certainty, but probably did not exceed 4 grains.*

Officinal preparations.—Liq. Arsen. Chloridi. Liq. Potas. Arsenitis.

ARSENICI ET HYDRARGYRI HYDRIODATIS LIQUOR, *D.*

Synonyme. Solution of Iodide of Arsenic and Mercury. Donovon's Solution.

Take of Pure arsenic, in fine powder, six grains.
Pure mercury, sixteen grains.
Pure iodine, fifty grains and a half.
Alcohol, half a fluid drachm.
Distilled water, nine fluid ounces, or a sufficient quantity.

Rub together the arsenic, mercury, iodine, and spirit, until a dry mass is obtained; and having triturated eight ounces of the water with this in successive portions, let the whole be transferred to a flask, and heated until it begins to boil; when cooled and filtered, let as much distilled water be added to it, as will make the bulk of the solution exactly eight fluid ounces and six drachms.

Remarks.—The above proportions of mercury, arsenic, and iodine, are exactly such as are requisite for forming a teriodide of arsenic and a biniodide of mercury, and it is a case of simple combination in these proportions. This solution consists, therefore, of 1 eq. teriodide of arsenic, AsI^3; and 1 eq. biniodide of mercury, $HgI^2 = AsI^3, HgI^2$.

Properties and uses.—It forms a pale greenish-yellow solution, without much flavour. It has only been used hitherto in lepra and psoriasis, in which it has acted beneficially. I have known it produce slight salivation.

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* Taylor's Med. Jurisprud.

Dose. — ♏v to ♏x three times a day. See observation on dose &c. of arsenious acid, p. 423.

PRÆPARATUM EX AURO.

PREPARATION OF GOLD. (Not Off.)

There is no officinal preparation of gold, nor am I aware that this metal is ever used medicinally in this country. It has been recommended on the Continent in the treatment of syphilis, but I have not seen any reports which make it appear worthy of adoption. The following extract illustrates both the mode in which it is used, and its most striking effect.

Take of Chloride of gold, gr. $\frac{3}{4}$.
Lycopodium, gr. xv.

Triturate them carefully together, and divide them into 20, the next time into 16, then into 12, and at last by degrees into 3 packets. The tongue and gums should be rubbed with one of these packets every day, and when under the influence of the gold they assume a purple red colour.* The dose is therefore gr. $\frac{1}{27}$ at first, gradually increased to gr. $\frac{1}{4}$.

PRÆPARATA E BARIO.

PREPARATIONS OF BARIUM.

BARIUM. *Symb.* Ba. Eq. 68.

Remarks. — Barium is a metal which is scarcely known to chemists beyond its mere existence; but its compounds have been long in extensive use as tests; and, it is for this purpose, chiefly, that they are now introduced in the Pharmacopœia.

BARYTA. (Not Off.)

BARYTES.

Remarks. — This earth is obtained by exposing carbonate of barytes to a high red heat, when it parts with its carbonic acid, and is converted into caustic barytes. It is nearly colourless; and, as prepared for chemical purposes, is generally in crystals. It is soluble in three times its weight of boiling water and in twenty times its weight of cold water. It is highly alkaline, and is a deadly poison. Its solution in water is much used as a test for carbonic acid. It is not in the Pharmacopœia.

Composition. — It consists of

1 eq. barium, 68; 1 eq. oxygen, $8 = BaO$; eq. 76.

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* Prescriber's Complete Handbook, by Trousseau and Reveil, translated by Dr. Nevins v. 253.

BARYTÆ CARBONAS, *D. E.*

Carbonate of Barytes. Witherite.

Remarks. — This earth is found naturally, and is therefore placed in the Materia Medica. It is a heavy, solid, translucent mass, of a light grey colour, or colourless, and somewhat resembling marble. It is extremely insoluble, but is not entirely without caustic power, as it destroys the paper in which it is long kept. It is also highly poisonous. At a temperature much higher than that required for "burning" lime, it parts with its carbonic acid, and is converted into caustic barytes.

Composition. — It consists of

1 eq. barytes, 68+8, 76; 1 eq. carbonic acid, 22=BaO,CO^2; eq. 98.

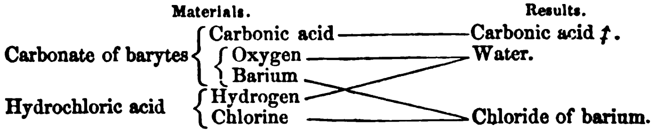
BARII CHLORIDUM, *D.*; BARYTÆ MURIAS, *E.*

Chloride of Barium, or Muriate of Barytes.

Take of Carbonate of barytes, broken into small pieces, ten ounces.
Hydrochloric acid, half a pint.
Distilled water, two pints.

Mix the acid with the water, and add the carbonate of barytes gradually to them. Then, heat being applied, and the effervescence finished, strain, and boil down the liquor that crystals may be formed.

Process. — When carbonate of barytes is added to hydrochloric acid both are decomposed. The chlorine of the acid unites with the barium of the earth and forms chloride of barium, which is dissolved by the water present; the hydrogen of the acid combines with the oxygen of the earth, and forms water, and the carbonic acid flies off as gas:



If common hydrochloric acid is used, the salt will be coloured yellow, and must be redissolved and recrystallised to obtain it pure. On evaporating the solution as above directed, the chloride crystallises in flat, thin, scaly crystals.

Description. — Chloride of barium is, when pure, a colourless, crystalline salt, the crystals being flat thin plates. It is soluble in less than three times its weight of cold water, and less than twice its weight of boiling water. It is neutral to test papers. The crystals contain water of crystallisation, which is given off at a moderate degree of heat. They may be raised to a very high temperature without being decomposed. The solution is instantly decomposed by free sulphuric acid, or by a soluble sulphate, and also by soluble carbonates; but not by carbonic acid gas, or by ammonia. The caustic alkalies do not decompose it, unless the solution is very concentrated.

Composition. — The *crystals* consist of

1 eq. barium, 68; 1 eq. chlorine, 36; 2 eqs. water, $9 \times 2 = BaCl,2HO$; eq. 122.

The anhydrous chloride consists of

1 eq. barium, 68; 1 eq. chlorine, $36 = BaCl$; eq. 104.

Medicinal properties. — *Liquefacient and resolvent.* In *large* doses, *irritant poison.* In *small* and *repeated* doses, after some time, it causes *perspiration* and *relaxed bowels*, with increased secretion of urine: at the same time, *glandular swellings* have been found to *disappear.* If long continued, it causes symptoms of irritation of the alimentary canal, and the patient becomes giddy and loses strength.

Uses. — Chloride of barium has been used with benefit in *scrofula*, especially where there was a tendency to inflammatory action, and in *scirrhus*, *bronchocele*, and some *cutaneous diseases;* but the chief purpose for which it is introduced into the Pharmacopœia is as a test for sulphuric acid and soluble sulphates, with which it forms a *white* precipitate, *insoluble in nitric acid.*

Dose. — See Liquor Barii Chloridi, below.

LIQUOR BARII CHLORIDI, *D.*; SOLUTIO BARYTÆ MURIATIS, *E.*

Solution of Chloride of Barium, *D.*, or of Muriate of Barytes, *E.*

Take of Chloride of barium, a drachm.
Distilled water, a fluid ounce.
Dissolve the chloride of barium, and strain.

Properties and uses. — See Barii Chloridum, above.

Dose. — ♏x, gradually increased until it disagrees with the patient.

Incompatibles. — It is important to give it in *distilled* water, as nearly all spring water contains sulphate of lime, which would decompose the chloride. It is best to give it simply dissolved, without addition.

BARYTÆ SULPHAS, *D. E.*

SULPHATE OF BARYTES. BaO,SO^3. Eq. 117. Heavy spar.

Remarks. — This substance is insoluble, and does not possess any medicinal properties. It constitutes the chief portion of what is commonly sold as calamine. When mixed with charcoal and heated to redness for some time, it is converted into sulphuret of barium, which may be dissolved by hydrochloric acid, and formed into chloride of barium. There are no preparations made from it in either the Dub. or Ed. Pharm.

PRÆPARATUM E BISMUTHO.

PREPARATION OF BISMUTH.

BISMUTHUM.

BISMUTH. *Symb.* Bi. Eq. 71 or 213.

Description. — Bismuth is a metal having a grey colour, with a slight tinge of red. It is brittle; fusible at 476° F.; crystallises on cooling; and sublimes at a red heat. Its sp. gr. is about 9·8. It becomes slightly tarnished if long exposed to air. It is readily dissolved by nitric acid, but is little affected by hydrochloric or sulphuric acid.

Metals for which it may be mistaken. — It resembles metallic antimony and arsenic in appearance, but is distinguished from them by its colour, its greater weight, and the action of tests.

Tests. — Bismuth is distinguished by being readily soluble in nitric acid, with evolution of nitrous acid fumes. If water is *largely* added to the solution, a brilliant white precipitate is thrown down. If sulphuretted hydrogen is passed through the solution, or acts upon the precipitate, it produces a black sulphuret of bismuth.

BISMUTHI NITRAS, *L. D. E.*

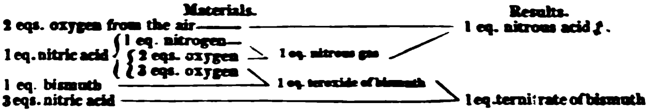
NITRATE OF BISMUTH.

Synonyme. Bismuthi Trisnitras, *Ph. L.* 1836. Bismuthi Subnitras, *D.* Bismuthum Album, *E.* Magistery of Bismuth. Pearl white. Spanish white.

Take of Bismuth, an ounce.
Nitric acid, a fluid ounce and a half.
Distilled water, three pints.

Mix a fluid ounce of the water with the acid, and the bismuth being added, apply heat until it is dissolved. Pour the solution into the remaining water, and strain the mixture through linen that the powder may be separated. Wash this with distilled water, and dry it with a gentle heat (in a dark place, *E.*).

Process. — When nitric acid comes in contact with metallic bismuth, chemical action immediately ensues, and is so violent that it is necessary, previously, to add a small portion of water to the acid, as is directed by the College. For the changes which take place, see Arg. Nitr. p. 404., substituting bismuth for silver, whenever the metal is named.



When this solution is poured into a large quantity of water, the ternitrate is decomposed, and an insoluble nitrate is precipitated, whilst the greater portion of the acid remains combined with some of the bismuth, forming an acid nitrate of bismuth, which remains in solution.

The insoluble precipitate is now called nitrate of bismuth, though in the last Pharmacopœia it was styled trisnitrate. The soluble acid nitrate is disregarded by the College, but it may be rendered available by adding carbonate of soda, or solution of potash, which precipitates it as a carbonate or oxide of bismuth, which may be dissolved by nitric acid as at first, and again precipitated by water.

Properties. — This is a brilliantly white powder, when first made; on drying, it loses some of its brilliancy. It is occasionally gritty.

Characters and tests. — It is dissolved by nitric acid, without effervescence. Diluted sulphuric acid being added, nothing is thrown down.

Adulteration. — It is not often adulterated by any strictly fraudulent mixture like chalk; but it frequently contains oxide or carbonate of bismuth, which is thrown down as described above, and is allowed to subside along with the nitrate. They are then dried together. It is a question how far the preparation is medicinally injured by the mixture, but it is probable that it is of no consequence in this respect. The first test proves the absence of chalk, the most likely fraudulent adulteration; and the second removes the danger of its being mistaken for carbonate of lead, which would not only effervesce with the acid, but form a white precipitate of sulphate of lead with the sulphuric acid.

Powders for which it may be mistaken. — All the colourless powders of the Pharmacopœia. It can only be distinguished by the effects of tests.

Medicinal properties. — *Tonic* and *antispasmodic.* It is not easy to give an unexceptionable name to its properties. It allays the pain of gastrodynia, and checks the copious secretion of fluid in pyrosis. In small doses, it does not produce a perceptible effect upon any of the secreting or excreting organs. In overdoses, it causes pain, vomiting, and purging, and sometimes giddiness.

Uses. — Nitrate of bismuth has long been used as a *cosmetic*, under the name of magistery of bismuth. It has been chiefly employed medicinally, in *gastrodynia*, or acute pain in the stomach occurring immediately or very soon after taking food, unaccompanied by inflammation; and in *pyrosis*, the chief feature in this disease being the copious eructations of mouthfuls of hot alkaline fluid, generally accompanied by pain and heat in the stomach. It has, however, been very strongly commended by Dr. T. Thompson, in the treatment of the *diarrhœa* of *phthysis*, in which he finds it superior to any other remedy he has tried. The dose employed was gr. v three or four times daily, mixed with a little magnesia and gum arabic.*

Dose and administration. — Nitrate of bismuth is usually given in the form of mixture, combined with carbonate of magnesia, in doses of gr. v to ℈j or ʒss, three or four times daily. Pereira generally begins with ℈j, but I have repeatedly seen every good effect that could be desired, follow its use in doses of gr. v or gr. x.

PRÆPARATA E CALCIO.

PREPARATIONS OF CALCIUM.

CALCIUM. *Symb.* Ca. Eq. 20.

Remarks. — Calcium is the metallic base of lime. Nothing is known about it, except that it is a brilliantly white, combustible metal.

CALX, *L. D. E.*

Lime (Caustic).

Synonyme. Calx viva. Quick Lime.

Remarks. — This is now placed in the Materia Medica, and no directions are given for its preparation. The Ph. Ed. gives the following directions: — "Heat white marble broken into small fragments, in a covered crucible, at a full red heat for three hours."

Process. — Marble or chalk consists of lime and carbonic acid;

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* Ranking's Abs. vol. viii. p. 261.

in other words, is carbonate of lime. When exposed to a high temperature, the carbonic acid flies off, and (quick) lime remains in the furnace. This operation is usually performed on the large scale, and cases have occurred in which persons falling asleep near a lime-kiln have been killed by the carbonic acid evolved. In the old Pharmacopœias, oyster shells were ordered to be burnt, and lime preparations were made from them. They consist of carbonate of lime, with albumen and other animal matters which were destroyed by the heat, and lime was left behind.

Properties. — Pure lime is colourless, and is moderately hard, but can easily be broken. It is slightly soluble in water (see Liquor Calcis, p. 432.), to which it imparts alkaline properties. It changes vegetable yellows to brown, and blues to green, has a caustic disagreeable taste, and when kept for some time in contact with the skin acts as a caustic. It has a strong affinity for water and for carbonic acid, and if exposed to the air, gradually absorbs both, and falls to powder, being reconverted into carbonate of lime. When water is poured upon it, no effect is perceived for a few seconds; but it then begins to swell, and becomes very hot, and quickly falls into a tolerably fine powder.

Composition. — Lime consists of

1 eq. calcium, 20; 1 eq. oxygen, 8 = CaO; eq. 28.

Characters and tests.—It falls into a powder when "slaked" by the addition of water. It is dissolved without effervescence by diluted hydrochloric acid. The solution throws down nothing when ammonia is added in excess.

Lime is not likely to be adulterated purposely, but it may have become converted into carbonate from exposure to the air; in which case it will not fall into powder on the addition of water, and it will effervesce on the addition of dilute hydrochloric acid.

Medicinal properties and uses. — Quick lime acts as a *caustic* when applied to the skin, and is sometimes employed for this purpose. It furnishes a most valuable and efficient *extempore hot bath*, sometimes termed "the poor man's vapour-bath," when the patient cannot be removed from bed. Let two lumps of quick lime, the size of the fist, be folded in two separate cloths soaked in cold water, and let each be again folded in a dry cloth. Let them then be placed between the sheets, in which the patient is lying, one on each side, but at a little distance from him, for fear of scalding him. In from five minutes to half an hour the lime begins to heat, the water is converted into steam which fills the bed, and envelopes the patient in a steam-bath for half an hour or more if desired. The lime may then be removed, the patient instantly rubbed for a *few moments* with towels wet with *cold*[*] water, then *quickly* dried, and the sheets changed. I have repeatedly used this plan in acute rheumatism and acute dropsy, and in other cases in which it was desirable that the patient should not leave the bed. It is a convenient plan, also, in houses which do not possess a bath.

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[*] By this means the profuse sweating is checked, but the body is not chilled, and there is no subsequent continuous perspiration, which only weakens the patient without abating the disease.

LIQUOR CALCIS, *L.D.E.*

LIME-WATER.

Synonyme. Aqua Calcis, *D.E.*

Take of Lime, half a pound.
Distilled water, twelve pints.

Upon the lime, first slaked with a little of the water, pour the remaining water, and shake them together; then immediately cover the vessel, and set it by for three hours; afterwards keep the solution with the remaining lime in stopped glass vessels, and when it is to be used, take from the clear solution.

Process. — This is a case of simple solution; but lime possesses the remarkable property of being more soluble in cold than in hot water: so that if lime-water is made in cold weather, minute crystals of lime may often be found adhering to the sides of the bottle when the temperature is raised during warm weather. Dr. Dalton found that 1 grain of lime required for solution

778 grs. of water at 60° F.; 972 grs. at 130° F.; and 1270 grs. at 212° F.

Mr. Phillips finds that

A pint of water,	at	32° F.,	dissolves	13·25	grains of lime.
„	„	60° F.	„	11·6	„
„	„	212° F.	„	6·7	„

Freezing water is, therefore, capable of dissolving nearly twice as much lime as boiling water.

Properties. — Lime-water is colourless and inodorous; it has a disagreeable styptic taste, and possesses all the properties of an alkali, changing vegetable blues to green, and yellows to red, and neutralising strong acids. It quickly absorbs carbonic acid from the air, and a crust of carbonate of lime forms upon its surface. This change would proceed, if the exposure was continued, until the whole of the lime was precipitated. It is to prevent this, and to compensate for the loss of any lime which may be accidentally converted into carbonate, that the lime-water is ordered to be kept over the excess of undissolved lime. Lime-water unites with oils, and forms an imperfect soap of the class generally known as "white oils."

Composition. — It is evident that the strength of lime-water varies with the period of the year. As an average, it may be considered to contain about 12 grains in the pint.

Medicinal properties. — Lime-water is *antacid*, and has considerable influence in suppressing obstinate vomiting when dependent upon irritability of the stomach. It is *lithontriptic* and *astringent*.

Uses. — There is scarcely any remedy so effectual in allaying *obstinate vomiting*, dependent upon irritability of the stomach. It is generally given in this case in doses of f℥ss to f℥iij; or, as a drink, *ad libitum*, combined with an equal quantity of milk. In *calculous* affections attended with undue secretion of *lithic acid*, the relief derived from its use is remarkable. In *chronic dysentery* it is given as an astringent, combined with milk. For *scrofulous ulcers* it sometimes forms a useful astringent lotion. When combined with oil, it is popularly applied to *burns*, but this is a very objectionable practice. (See Lin. Calcis, p. 369.) In *strumous enlargement of the glands*, lime-water is sometimes used with benefit as a resolvent or alterative. In *syphilitic* sores it is in daily use as an ingredient in the well-known "black wash." It is sometimes given as an *antidote* to poisoning by oxalic acid. In *chronic cutaneous* diseases it is often useful when combined with sarsaparilla; and in *atonic chronic diarrhœa* in infants I find it a useful remedy.

Incompatibles. — All acids, and carbonated alkalies, and alkaline and metallic salts. It is more or less unsuitable for combination with almost every article in the Pharmacopœia.

Dose. — f℥ss to f℥iij, combined with an equal quantity of milk.

CALCII CHLORIDUM, *L. D. E.*

Chloride of Calcium.

This compound is now placed in the Materia Medica by the London College, and no directions are given for making it. It is prepared in the Ph. Ed. by dissolving broken marble in commercial muriatic acid till effervescence ceases, and then adding powdered marble until it ceases to redden litmus paper; filtering and evaporating till crystals form, which are to be fused in a crucible or iron ladle, and, whilst fluid, poured upon a *cold* smooth stone, so that it may be solidified as quickly as possible. It is then to be *immediately* broken up, and kept in *closely* stopped bottles. The reasons for these precautions will be seen when its properties are described.

Decomposition. — See Barii Chloridum, p. 426., substituting lime for barytes.

Properties. — Pure chloride of calcium is colourless, inodorous, and translucent, and its taste is bitter and acrid; but, if prepared from commercial acid, it has a yellow colour. It is *very deliquescent*, and rapidly attracts moisture from the air in such a degree as to become liquid. It is soluble in about a fourth of its weight of water, and is also soluble in alcohol. During solution it produces considerable cold, and it is a common ingredient in freezing mixtures.

Composition.—When evaporated from an aqueous solution, until it becomes solid on the removal of the heat, it forms crystals which contain much water, and consist of

1 eq. calcium, 20; 1 eq. chlorine, 36; 6 eqs. water $9 \times 6 = 54$ $= CaCl,6HO$; eq. 110.

When these crystals are fused at a low red heat, they lose the whole of the water, and consist of

1 eq. calcium, 20; 1 eq. chlorine, 36; $CaCl$; eq. 56.

Tests and adulterations.—It is not liable to be adulterated.

Medicinal properties and uses.—*Alterative; tonic; deobstruent.* Under its use glandular enlargements disappear, and the general health is improved. In *large* doses it causes nausea, pain in the stomach, sometimes purging, and giddiness; but, given in moderate doses, it acts imperceptibly upon the skin and mucous membranes. It is of eminent service in the treatment of *enlarged scrofulous glands* and *bronchocele* in patients whose constitutions are naturally so irritable as not to bear iodine, or who have been enfeebled by confinement and poor diet. Mr. Pearce informs me that he has seen it most beneficially employed, in an extensive dispensary practice in Bradford, amongst patients of this kind, who could not bear iodine. The cases in which it is employed are similar to those in which iodine has been found so useful. Dr. Wood* "has found it very valuable in the treatment of *tabes mesenterica*; checking purging, allaying hectic, diminishing the inordinate appetite, and frequently restoring the patient to health."

Dose and administration.—Chloride of calcium is always given in solution in distilled water. For the dose, see LIQUOR CALCII CHLORIDI, below.

Incompatibles.—It is incompatible with alkaline carbonates and sulphates, and with most vegetable infusions. It is best given in distilled water alone, or flavoured with some simple syrup.

Officinal preparations.—Liquor Calcii Chloridi. It is also employed in the formation of alcohol, in order to separate the water with which the spirit is associated.

LIQUOR CALCII CHLORIDI, *D.E.*

SOLUTION OF CHLORIDE OF CALCIUM.

Synonyme. Solutio Calcis Muriatis, *E.*

Take of Chloride of calcium, three *D.*, eight *E.*, ounces.
Distilled water, twelve fluid ounces.
Dissolve the chloride of calcium, and strain.

Remarks.—This solution is ordered simply to furnish a convenient formula for prescriptions. The strength of the Ed. solution is nearly three times that of the Dub. one.

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* Quoted by Pereira.

Medicinal properties and uses.—See Calcii Chloridum, above.

Dose and administration. — ♏xl to f℥ij, or until nausea is produced. It should be given in distilled water, flavoured with syrup. Of the Ed. Sol., one third the above dose.

CALX CHLORINATA, *L. D. E.*

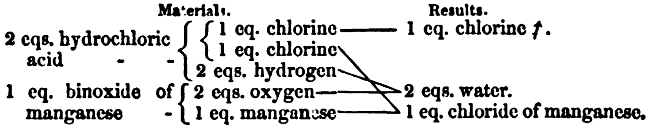
Chlorinated Lime.

Synonyme. Hypochlorite of Lime. Chloride of Lime.

This substance is now placed in the Materia Medica by all the Colleges, and no directions are given for its manufacture. It is prepared on a large scale by spreading recently slaked lime in thin layers upon trays, in a closed room into which chlorine is admitted. The gas is absorbed in large quantities by the lime, and forms the chlorinated lime.

The nature of this compound, and the chemical changes which take place during its formation, are still matters of uncertainty, and the opinion of chemists is so much divided, that the name of chlorinated lime is retained as expressing the constituents, without giving any opinion as to the nature of the compound.

Process. — The changes produced in obtaining chlorine are the following. When binoxide of manganese is acted upon by hydrochloric acid, aided by a gentle heat, both are decomposed. The 2 eqs. of oxygen leave the manganese and combine with 2 eqs. of hydrogen from 2 eqs. of hydrochloric acid, and form 2 eqs. of water. The 1 eq. of manganese combines with 1 eq. of chlorine from the decomposed acid, and forms chloride of manganese; and the second equivalent of chlorine is thus left free, and escapes as a gas.



For manufacturing purposes, and sometimes also for purposes of fumigation, chlorine is obtained less directly by means of common salt (chloride of sodium), sulphuric acid, and binoxide of manganese. In this case, by the action of sulphuric acid upon the salt, hydrochloric acid is first formed, and this acts as above, upon the binoxide of manganese, and gives rise to the evolution of chlorine. (See Hydrochloric Acid, p. 84.)

Properties.—Chlorinated lime, when pure, is white, but it generally has a brownish tint; it emits a weak smell of chlorine, and its taste is strong. It is only partially soluble in water, the lime uncombined with chlorine being comparatively insoluble. It possesses powerful bleaching properties; when exposed to the air it is gradually decomposed, chlorine is given out, and carbonate of lime formed. It is also decomposed by a strong heat; chlorine coming over first, and afterwards oxygen, derived from the decomposition of the lime; chloride of calcium remaining.

Composition. — This compound, according to Mr. Phillips's analysis, consists of

1 eq. of chlorine, 36; 2 eqs. of hydrate of (slaked) lime, 74;

but as only part of it is soluble, and the remainder consists almost entirely of lime, he supposes it to be composed of 1 eq. of chloride of lime and 2 eqs. of water, forming the soluble portion; mixed with 1 eq. of lime. According to this view, it is composed of

1 eq. bihydrated chloride of lime ($CaO,Cl,2HO$); 1 eq. lime, $=CaO,Cl,2HO+CaO$; eq. 110.

It has been supposed by Balard to be a mixture of hypochlorite of lime, and chloride of calcium ($3CaO, ClO)+4HO+CaCl$.

Medicinal properties and uses. — Chloride of lime, when exposed to the air, slowly evolves chlorine, which has the property of removing offensive animal odours. These are conjectured, but without any positive proof, to be compounds of hydrogen, with a peculiar organic basis; and the chlorine uniting with the hydrogen, decomposes them, and thus the smell is destroyed. It has been generally supposed, also, to destroy infectious miasmata or effluvia, and on this ground it has been extensively used in hospitals and private sick chambers. It is undoubted that it does, in a great degree, if not entirely, destroy the offensive odours of many diseases, and this is a valuable quality, the benefit of which can scarcely be over estimated; but it is still doubtful* whether it has the power of destroying infections. It is given internally with great advantage in *fever*, when the *stools* are of a *dark* and very *offensive* character, and the *tongue black*, or nearly so. In these cases, its employment has been followed by a clearer tongue and a very improved state of the excretions. In fever generally, the powder, either dry or dissolved in water, should be sprinkled over the evacuations, and upon the floor of the apartment, at intervals, as it may be required; and the sheets and bedding should be occasionally sprinkled with a solution. In *dysentery*, it has been found of great service in checking the profuse or frequent evacuations. It is applied as a lotion, with much benefit, to foul *ulcers* or *sloughing surfaces*; and not only corrects the fetor of the discharges, but induces a more healthy action in the diseased part. It has been used as a *collyrium* in *purulent ophthalmia*, with good effect, in the proportion of gr. x to ℈j, or more, of the powder, dissolved in an ounce of water. It has been used as a *gargle* in various forms of *sore throat*, and is stated to have been successfully employed as a substitute for sulphur in the cure of *scabies*. It is an *antidote* against *poisoning* by *hydrosulphuric acid*. The chlorine combines with the hydrogen, and the sulphur is deposited in an inoffensive form. By this means the injurious effects of cesspools have been overcome. A person exposed to them should wear, in front of his face, a cloth soaked in a solution of the chloride of lime, through which the sulphuretted hydrogen will then pass, and be decomposed in its passage.

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* The controversy upon this subject is given at considerable length in Pereira's Materia Medica.

Dose and administration.— For *internal* use, chloride of lime should be given in solution, combined with a little syrup. The usual dose is from gr. ij to gr. v. When dissolved, the solution should be filtered, in order to separate the undissolved lime. For *lotions* and *gargles*, gr. x to ℈j in an ounce of water, though it is sometimes employed in larger quantities. For the purpose of removing smells, it may be used *ad libitum*, the limit being fixed by convenience and the effect produced.

Incompatibles. — These are dependent upon the purpose for which it is intended. If for internal administration, all acids, and spirit of nitric ether, are incompatible, as they decompose it, and evolve the chlorine; alkaline carbonates are also incompatible. It is not likely to be prescribed internally with any other incompatible substance. If, however, it is intended for fumigations, acids may be good additions, as they occasion a more rapid evolution of the chlorine, and thereby a more speedy effect. In lotions and gargles, metallic and earthy salts should be avoided.

As an extempore fumigation, when this substance is not at hand, equal weights of common salt and black oxide of manganese may be mixed in a saucer with rather less than twice the weight of sulphuric acid diluted with its own weight of water.

CALCIS CHLORINATÆ LIQUOR, *D.*

SOLUTION OF CHLORINATED LIME.

Take of Chlorinated lime, half a pound.
Water, half a gallon.

Blend well the water and chlorinated lime by trituration in a large mortar, and having transferred the mixture to a stoppered bottle, let it be well shaken several times for the space of three hours. Pour the contents through a calico filter, and preserve the clear solution in well stopped bottles.

Medicinal properties and uses.— See CALX CHLORINATA, p. 436.

Dose.— Each fluid drachm contains gr. vi of the powder; the dose is therefore from ♏xx (gr. ij) to fʒj (gr. vi).

CALCIS CARBONAS PRÆCIPITATUM, *D.*

Take of Chloride of calcium, five ounces.
Crystals of commercial carbonate of soda, thirteen ounces.
Boiling water, four pints.

Dissolve each salt in a quart of water; mix the two solutions, and when the precipitate has subsided, draw off the supernatant liquor. Wash till the washings do not affect solution of nitrate of silver, and dry at a heat of 212°.

Process.— This is a case of double decomposition, in which the carbonic acid leaves the soda and takes the lime, forming carbonate of lime, and the muriatic acid leaves the muriate of lime (chloride of calcium) and forms muriate of soda, which remains in solution.

Materials.		Results.
1 eq. carbonate of soda	1 eq. soda	1 eq. muriate of soda.
	1 eq. carbonic acid	
1 eq. muriate of lime	1 eq. muriatic acid	
	1 eq. lime	1 eq. carbonate of lime ↓.

Remarks.—This is a very unnecessary refinement upon prepared chalk, for which it is intended to be a substitute. (See CRETA PRÆP. p. 439.)

CALCIS PHOSPHAS PRÆCIPITATUM, *D.*

PRECIPITATED PHOSPHATE OF LIME.

This is prepared by digesting bones, previously burnt to whiteness, in muriatic acic diluted with two parts of water, until they are dissolved, and then diluting the solution with as much more water, and adding solution of ammonia until the liquid becomes alkaline. The precipitate which falls is to be washed on a calico filter until the washing cease to precipitate with solution of nitrate of silver, and afterwards dried.

Process.—Bones consist of phosphate of lime and a small quantity of carbonate of lime, which give them their hardness; and of animal matter (albumen, gelatine, and oil or fat), which gives them their toughness and strength. When burnt, the animal matter is at first converted into charcoal; but by continuing the heat *with free exposure to the air*, the charcoal is converted into carbonic acid, and leaves the earthy portions of the bone nearly or perfectly white. When this is digested in diluted muriatic acid, it is dissolved, and the solution contains both phosphate of lime and chloride of calcium. On adding solution of ammonia, the acid is neutralised, and the phosphate of lime is precipitated in conjunction with a little uncombined lime, most of which is washed away, leaving the phosphate nearly pure.

Property and uses.— It has been proposed to give phosphate of lime in rickets, in order to supply the earthy matter which is deficient in the bones in this disease; but experience hitherto has not proved it to be of much utility. When administered with this object, it ought to be made into bread along with flour, &c., or else to be dissolved in muriatic acid and given in solution.

Dose.— The dose of a solution in muriatic acid may be ♏xx to ♏xxx, two or three times a day, care being taken that the stomach is not injured by the acid. When made into bread, ℈j to ʒj, or ʒij, may be taken in the course of the day.

CRETA PRÆPARATA, *L.D.E.*

PREPARED CHALK.

This substance is now placed in the Materia Medica, but I have retained the old directions to show how it is prepared.

Take of Chalk, a pound.
Water, as much as may be sufficient.

Add a little water to the chalk, and rub it that it may become fine powder. Put this in a large vessel with the rest of the water; then stir it, and after a short interval pour off the supernatant water, still turbid, into another vessel, and set it by that the powder may subside; lastly, the water being poured off, dry this powder and keep it for use.

Process.—In this process, which is termed *elutriation*, the chalk is reduced to a fine powder, and the finest particles remain suspended for a few moments in the water. When this is poured off, they gradually subside, and when dried form little white conical masses, which easily crumble in the fingers, and ought to be free from grittiness.

Properties.—Common chalk always contains some silica, and is not easily rubbed to an impalpable powder. The prepared chalk is free from this objection, though there is no chemical difference. Though insoluble in pure water, carbonate of lime is soluble in water containing a large excess of carbonic acid; and a solution prepared by forcing carbonic acid under pressure, into water, in which carbonate of lime is diffused, is sold under the name of *Carrara water*. In this liquid the lime exists in small quantities in the form of a *bicarbonate*. The second eq. of carbonic acid readily escapes when the solution is heated, or even when simply exposed to the air for some time, and the lime is reconverted into the insoluble carbonate, and is precipitated. The bottles ought therefore to be carefully corked until they are wanted for use.

Composition.—Chalk is a variety of carbonate of lime, and when dry, consists of

1 eq. lime, 28; 1 eq. carbonic acid, 22 = CaO,CO^2; eq. 50.

Characters and tests.—It is almost entirely dissolved by dilute hydrochloric acid, emitting bubbles of carbonic acid. This solution throws down nothing, either when hydrosulphuric acid is added, or when boiled, or when ammonia or lime-water is added in excess.

I never heard of chalk being adulterated, nor does there seem the slightest necessity for the tests given in the Ph. L.

Substances for which it may be mistaken.—The conical masses are not liable to be mistaken, but when powdered it resembles any other white powder, and must be distinguished by the proper tests.

Medicinal properties and uses.—See MISTURA CRETÆ. The Carrara water is a mild and grateful astringent, and may be used in dyspepsia accompanied with acidity and a tendency to diarrhœa. It may be mixed with ♏xxx of some mild bitter tincture, such as Tr. calumbæ, at the time of drinking it.

Officinal preparations.— Mist. Pulv. Cret. Co. et c. Opio. Conf. Arom.

PRÆPARATA E CUPRO.

PREPARATIONS OF COPPER.

CUPRUM.

COPPER. *Symb.* Cu. Eq. 32.

Remarks.—Copper is a well-known metal characterised by its red colour. Its sp. gr. is 8·6. It does not undergo much change when exposed to a dry air, but if moisture is present, it quickly rusts, and forms a green compound, which is carbonate of oxide of copper. It is attacked with difficulty by hydrochloric and sulphuric acids, but rapidly decomposes nitric acid, and is converted into an oxide, which combines with remaining undecomposed acid. If air is entirely excluded, it is not affected by solutions of vegetable acids, as acetic and citric acids, but they rapidly act upon it when air is freely admitted. It is also quickly oxidised by the action of either hot or cold oils and fats; and though it is sometimes stated that oil may be safely boiled in a copper pan if not allowed to cool in it, the statement is not entirely consistent with facts.

Copper combines with oxygen in two proportions, forming a *red* dinoxide, Cu^2O, which does not form salts, and a *black* oxide, CuO, which is the basis of all the salts of this metal. When this oxide is combined with water, it is *greenish-blue*, and becomes black when dried and heated. Copper also combines with chlorine, iodine, and sulphur, but these compounds are not used medicinally. Almost all the *salts of copper* are *green* or *blue*.

Medicinal properties.—*Metallic* copper is generally supposed to be devoid of medicinal properties, and cases have occurred, in which children have swallowed halfpence, and retained them so long in the stomach, that a considerable part of the coin has been digested, without any injury to the health. A case is, however, quoted by Taylor (*Med. Juris.*) in which a copper alloy, in a very fine state of division, caused dangerous symptoms in a boy who was for some days exposed to its effects, whilst diffused through the air of the room in which he worked. All the salts of copper are, however, poisonous, and this is the most convenient place for mentioning their usual effects.

Poisonous effects of the compounds of copper.— There is scarcely a recorded case in which any of these have been *administered* as a poison, with fatal effects; but serious accidents have frequently been occasioned by the employment of copper utensils in cooking. The usual symptoms of poisoning are, *violent vomiting*, and the vomited matters are generally green or blue; severe *abdominal pain; frequently*, *diarrhœa;* sometimes there are *cramps* of the extremities, and *jaundice* has been noticed in a few instances. The taste of the salts of copper is so horrible that they could not be swallowed in a poisonous dose without the sufferer being aware of it at the time.

Post-mortem appearances.—The stomach and bowels are inflamed, and the mucous membrane of the œsophagus, stomach, and bowels, of a green or blue colour. This, however, is not an infallible sign of poisoning by a copper salt, as a morbid state of the bile sometimes gives this tint to the stomach. When the colouration is dependent upon bile, it does not, however, extend to the œsophagus and small intestines (*Taylor*).

Antidotes.—As one of the first effects of the poison is copious vomiting, emetics and the stomach pump are almost equally useless and injurious. Free diluent draughts of *milk* or warm water to promote the vomiting should be administered, and *eggs* have also been proposed as an antidote, in consequence of the formation of an insoluble albuminate of copper. In order to do any good, they must be given in very large quantities. *Sugar* has been often advised, and is perhaps useful. *Iron filings* cannot operate quickly enough to be of any value; and the salts of iron formed, even if they did act, would be injurious. *Hydrated peroxide of iron* has lately been proposed, without much evidence of its value.

The best treatment is preventive. Since poisoning with copper is generally the result of accident, copper vessels ought to be kept *scrupulously clean;* in general, they are best if tinned; *acid* and *oily* substances should *not* be prepared in them; and whatever kind of food is cooked in them should be *removed into another vessel before it cools.* Halfpence or copper salts should never be added to pickles, in order to give them a fine colour.

Tests.—The tests for copper salts are delicate and characteristic. If a piece of *bright iron* is immersed in a solution, unless it is *very* dilute, the surface soon becomes covered with a coating of metallic copper which is recognised by its colour. *Solution of ammonia*, or of *sesquicarbonate of ammonia*, instantly communicates a blue colour to a *clear* solution. This test is characteristic, but not delicate; and if the solution is very dilute, a faint tinge of blue, even if produced, is not easily recognised.

Hydrosulphuric acid (*sulphuretted hydrogen*) causes a deep brown or black colour, and ultimately a black precipitate. This is *very* delicate, but not characteristic, as many other metallic salts are similarly affected by this gas. *Ferrocyanide of potassium* (prussiate of potash) gives a deep claret-red coloured precipitate. This is *very* delicate and highly characteristic, no other metal being thus affected. The iron test has an advantage over all the others, in being applicable to any mixture, no matter how complicated or discoloured; and if any doubt exist as to the nature of the red deposit, it may be scraped off and a few drops of diluted nitric acid added to the scrapings; if it is copper, it will be dissolved with the evolution of red nitrous acid fumes, and a blue solution will be formed, to which the above tests may be applied. The advantage of the ammoniacal test is that *smelling salts* are generally at hand, and can be easily added to a pickle or any cooked article, which is supposed to be accidentally impregnated with copper.

CUPRI SUBACETAS, *D.*

SUBACETATE OF COPPER.

Synonyme. Diacetate of Copper. Ærugo, *L. E.* Verdigris.

See LINIMENTUM ÆRUGINIS, p. 367.

CUPRI AMMONIO-SULPHAS, *L. D. E.*

AMMONIO-SULPHATE OF COPPER.

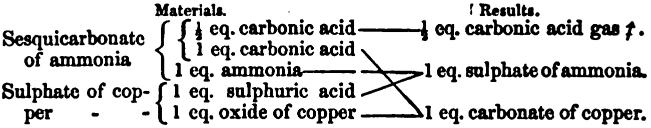
Synonyme. Cuprum Ammoniatum, *E.*

Take of Sulphate of copper, an ounce.
Sesquicarbonate of ammonia, an ounce and a half.

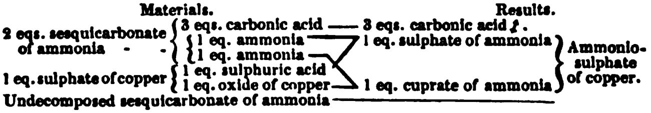
Rub them together until carbonic acid ceases to escape; then dry the ammonio-sulphate of copper, wrapped in bibulous paper, in the air.

Decomposition.—When sulphate of copper and sesquicarbonate of ammonia are rubbed together, the mixed mass becomes moist, swells up, evolves carbonic acid, and assumes a beautiful deep blue colour. The theory of the changes is somewhat obscure, but carbonate of copper, and sulphate of ammonia, are formed, and some excess of sesquicarbonate of ammonia remains undecomposed.

Both the salts are decomposed; 1 eq. of carbonic acid, leaves the ammonia and combines with the oxide of copper to form carbonate of copper, whilst the remaining ½ eq. of carbonic acid flies off as gas. The sulphuric acid from the decomposed sulphate of copper combines with the ammonia, and forms sulphate of ammonia.



Pereira is, however, of opinion, that the whole of the carbonic acid is given off, and that the ammonia and oxide of copper forms *cuprate* of *ammonia*, which is combined with some sulphate of ammonia, and undecomposed sesquicarbonate of ammonia.



Properties.—It has a deep azure-blue colour, if not dried by too great a heat, and if excess of sesquicarbonate of ammonia is present. It is soluble in water. If kept in closely stoppered bottles, it may be preserved long unchanged, but if exposed to the air, it loses the excess of sesquicarbonate of ammonia, and becomes green and insoluble in water. It has an ammoniacal odour, and a disagreeable metallic taste.

Composition.—According to Mr. Phillips, it consists of

1 eq. carbonate of copper; 1 eq. sulphate of ammonia; and some undecomposed sesquicarbonate of ammonia.

According to Pereira, it consists of

1 eq. cuprate of ammonia; 1 eq. sulphate of ammonia; 1 eq. water; and some undecomposed sesquicarbonate of ammonia.

Characters and tests.—Blue powder; it is changed into oxide of copper by a hot fire, sesquicarbonate of ammonia being first evolved, and afterwards sulphate. It is dissolved by water. This solution changes the colour of turmeric to brown, and produces a green colour on the addition of arsenious acid.

Medicinal properties and uses.—It is *tonic* and, in some sense, *antispasmodic;* i. e. it exerts an influence in restraining involuntary motions of the body. It is often used with success in *epilepsy*, and sometimes in *chorea;* and in *hysteria* and *cramp of the stomach*, with less obvious good effects. Like everything else, it often fails in epilepsy. It is *also a stimulating astringent* when applied topically, in solution, to ulcers.

Dose and administration.—It is generally given in the form of pills combined with some soft extract or bread crumbs, in doses of gr. j to gr. iij. The pills should not be made long before being used.

LIQUOR CUPRI AMMONIO-SULPHATIS, *L. E.*

SOLUTION OF AMMONIO-SULPHATE OF COPPER.

Synonyme. Solutio Cupri Ammoniati, *E.* Aqua Sappharina.

Take of Ammonio-sulphate of copper, a drachm.
Distilled water, a pint.
Dissolve and strain.

Properties.—This solution has a deep blue colour, and if excess of sesquicarbonate of ammonia is present it remains unchanged. If there is no excess it becomes decomposed, and the oxide of one half of the salt of copper is precipitated (*Phillips*).

Medicinal properties and uses. — It is a *stimulant detergent*, and is applied to indolent ulcers. When diluted with two or three times the quantity of water it is applied to the eye, to remove slight opacity of the cornea.

It is also employed as a test for the presence of arsenious acid, with which it produces a green colour.

Dose. — It is not administered internally.

CUPRI SULPHAS, *L. D. E.*

SULPHATE OF COPPER.

Synonyme. Blue Vitriol. Blue Copperas. Blue Stone.

Take of Commercial sulphate of copper, four pounds.
Boiling distilled water, four pints.

Pour the water upon the sulphate, and apply heat, frequently stirring, until it is dissolved. Strain the solution whilst still hot, and set it aside that crystals may be formed. Evaporate the liquid which is poured off that it may again form crystals. Dry them all.

Preparation.—This salt is an article in commercial use, and is therefore placed in the Materia Medica, and no directions are given for its preparation. It is obtained from copper mines, in which it sometimes exists naturally in large quantities. The washings of the mines also yield a large supply, from the sulphuret being gradually converted into sulphate of copper by the oxidation of the copper and of the sulphur under the joint influence of air and moisture.

Description. — Sulphate of copper is a blue salt, generally in large crystals, the form of which is a right rhombic prism. It is soluble in about four times its weight of water, and the solution has a deep blue colour. It has a disagreeable styptic taste.

Composition. — Sulphate of copper consists of

1 eq. oxide of copper, 40; 1 eq. sulphuric acid, 40; 5 eqs. water, 45; $=CuO,SO^3,5HO$; eq. 125.

Or sulphatoxide of copper,

1 eq. copper, 32; 1 eq. sulphatoxygen, 48; 5 eqs. water, 45; $=Cu,SO^4,5HO$; eq. 125.

Salts for which it may be mistaken. — Its blue colour and the form of its crystals distinguish it from every salt, except those of copper. The nitrate may perhaps be mistaken for it, but its colour is a deeper blue. The crystals of the acetates are less regular than those of the sulphates, besides having a greenish instead of a blue colour.

Characters and tests. — It is dissolved by water; whatever ammonia throws down from this solution, an excess of ammonia again dissolves.

Adulterations.—It frequently contains large quantities of sulphate of iron, sometimes amounting to 20 or even 30 per cent. of adulteration. It is detected by the ammonia test; the oxide of iron thrown down not being soluble in excess of ammonia.

Medicinal properties. — *Escharotic; astringent; emetic; tonic?* When applied in the solid form to a granulating surface, it superficially destroys the granulations, but it can scarcely be called a caustic, as its escharotic powers are feeble. It acts rather as an astringent than as a caustic. In solution it makes a useful astringent lotion. Taken internally, in doses of gr. ij to gr. x, it seldom fails to excite speedy vomiting without much nausea, and in larger doses sometimes causes purging also. In *small* doses, gr. ⅛ to gr. j, it is one of the most valuable astringents for checking diarrhœa or chronic dysentery.

Characteristics as an emetic. — It acts speedily, and without causing much nausea: in a small dose, severely; has a very offensive taste; and if given in an overdose, or retained on the stomach, is itself poisonous.

Uses. — As an *escharotic.* Some persons prefer it to the nitrate of silver, *for repressing luxuriant and flabby granulations.* It acts favourably when applied to a *granular conjunctiva* and to *ulcers* of the *cornea.* As an *astringent*, in *languid* granulating *sores;* and when the solution is dilute, as a collyrium, in *chronic conjunctivitis.* As an *emetic*, in cases of *poisoning*, especially by the *vegetable narcotics*, or when other emetics have failed to act. It is not safe to repeat its use, as may be done with other emetics. In *obstinate diarrhœa* it is often very valuable, conjoined with opium. It has been given as a *tonic* in *epilepsy*, with good effects.

Antidotes. — See CUPRUM, p. 441.

Dose. — As an *emetic*, gr. j frequently acts, but generally gr. ij to gr. x are required; as an *astringent*, *internally*, gr. ⅛ to gr. ¼ frequently answers the desired object; though Pereira speaks of gr. ss to gr. ij as a common dose, and it has been given for weeks in succession in doses of gr. vi, three times daily. As an *astringent lotion*, the strength of the solution varies from gr. j to gr. vi or gr. viii in f℥j of water.

Incompatibles.—It is not likely to be prescribed with any incompatible substance. It is generally given in the form of pills, with opium, and they should not be made long before being used. If made with bread crumbs, they very quickly become hard.

PRÆPARATA E FERRO.

PREPARATIONS OF IRON.

FERRUM.

IRON. *Symb.* Fe. Eq. 28.

Remarks.—Iron is so well known as not to require description. Its sp. gr. is 7·7. It is readily oxidised and dissolved by dilute sulphuric acid; and is also rapidly oxidised or becomes *rusty*, when exposed to the joint action of air and moisture. Perfectly bright iron remains unacted upon by water, if air is entirely excluded. Iron forms two definite compounds with oxygen, both of which form the bases of salts. It combines with 1 eq. of oxygen, forming *protoxide;* and with 1½ eq. of oxygen forming *sesquioxide.* The protoxide has a remarkable affinity for more oxygen, which it absorbs from the air and becomes converted into sesquioxide.

Medicinal properties.—It is probable that metallic iron does not possess any medicinal powers, but it is so readily oxidised by the gastric juices that decided effects are produced, even when it is administered in the metallic form; especially if acid wines or other liquors are taken at the same time. Its oxidation is accompanied with the evolution of hydrogen which gives rise to offensive and disagreeable eructations. It is almost the only metal the compounds of which do not possess poisonous properties when given in an overdose. In making this statement it is not, however, to be supposed that injurious consequences are never produced by the compounds of iron; on the contrary, if too long continued or injudiciously administered, they induce feverishness, and in some cases excite irritability of the bowels, and cause diarrhœa. This is especially the case with the tinctura ferri sesquichloridi.

Tests.—The salts of protoxide of iron are distinguished by forming a blue precipitate with solution of prussiate (ferrocyanide) of potash, which is pale at first, but rapidly becomes deep blue (Prussian blue); they also form a blue, brown, or black solution or precipitate (according to the degree of dilution), with tincture of galls (tannic acid), which is also pale at first, but becomes darker on exposure to the air. Solution of potash or of carbonate of potash produces a dirty green precipitate, which quickly becomes brown or black.

General medicinal effects of the compounds of iron. — *Tonic;* and some of them are also *styptic; emmenagogue;* and *antiperiodic.*

There are two general classes of cases in which tonics are prescribed: one, in which there is considerable fulness of habit, with florid complexion, and a tendency to febrile or nervous excitement, but without much real power; the other, in which the countenance is pale and bloodless, and there is much less appearance of strength — that condition which is usually termed *anæmia.* In the first of these, iron tonics are not generally so suitable as in the second, since they frequently excite feverishness, and derange the digestive organs, occasioning headache and uneasiness in the stomach and bowels. The pallor and debility of chlorosis and anæmia depend upon the want of iron, which is the colouring principle in the red particles of the blood; and the beneficial effects derived from the use of this metal arise from its supplying this essential ingredient. See also Mangan. Binox. Med. Props.

The emmenagogue properties of the compounds of this metal are dependent rather upon their tonic effects than upon any direct influence exerted over the uterus. As the general health improves, natural secretions previously deficient are increased, and thus the menstrual discharge is restored in cases of chlorosis. On the other hand, when secretions are excessive, owing to debility, the restoration of vigour to the system reduces them to the natural standard; and thus menorrhagia is checked by the administration of tonics. If, however, profuse menstrual discharge is dependent on plethora, it is evident that this class of remedies can only increase the mischief. Iron tonics increase the force of the circulation, and have a tendency to cause headache; they also excite so much feverishness as to be often inadmissible in phthysis and some other diseases, in which, from the degree of debility, they might seem to be indicated. As *antiperiodics,* they sometimes act with remarkably good effect in periodic neuralgia, whilst at other times they are quite inefficacious. In ague they have been entirely superseded by arsenic and the preparations of cinchona, but in some cases these remedies produce no benefit until conjoined with some form of iron. Some of the preparations of iron possess great styptic powers, which will be noticed under the head of the particular articles. The fæces are rendered dark or black by nearly all the preparations of iron, and constipation is frequently induced.

Uses. — These will be noticed under the respective preparations. The only purpose to which iron in the mass is applied, is for the production of a slough by means of the *actual cautery.* This is by many persons considered to be a barbarous and unjustifiable operation, and it has fallen into disuse in this country for a long period. Its employment is now in some degree reviving, and several opportunities for comparing its effects with those of caustic potash have satisfied me that less pain upon the whole is suffered from this than from the potash, and that in many chronic affections the ultimate effects are better. I have seen much relief follow its employment in the Co. Dublin Hospital, for very obstinate rheumatism of the sole of the foot, and for chronic disease of the hip, which had not been benefited by two issues made in the usual way. At Guy's Hospital this plan has been adopted several times with satisfactory results.

M. Notta has published the result of several cases of sciatica and other forms of neuralgia treated by the actual cautery in the following manner. The affected part was crossed two, three, or four times with a thin iron heated to whiteness, after which it was covered by compresses dipped in cold water. The subsequent pain was inconsiderable. "The most remarkable effect was the notable relief of the pain. Six of the patients were previously quite unable to walk, but in 5 or 6 hours the limb could be moved with facility, and in 24 or 48 hours the darting pain had disappeared. Of the 13 patients so treated 10 were perfectly cured, 2 were much relieved, and 1 only derived no benefit."—(*Ranking's Abs.* vol. vii. p. 27.)

In using the actual cautery, the skin surrounding the part to which the iron is to be applied, is to be defended by one or two thicknesses of dry leather, in which a hole has been cut, of a size equal to the space intended to be cauterised; the iron should be at a full red heat, and must not be applied more than two or three seconds. The issue resulting from actual cautery is smaller than the part cauterised, rather than being larger, as is the case with issues formed by potash or nitric acid.

Firing.—This method was introduced in 1826 by Sir A. Carlisle, but fell into disuse until it was lately revived by Dr. Corrigan, and it has since been tried and favourably reported upon by Dr. Day and others, whose reports, contained in the 13th and 20th vols. of Braith. Retrosp., will repay perusal: the method is very simple, and is scarcely accompanied by pain. Dr. Corrigan's apparatus, which answers very well, consists of a *flat* disk of iron, half an inch in diameter and a quarter of an inch thick, at the end of a piece of thick iron wire, which projects about two inches from a wooden handle. The disk is heated in the flame of a small spirit lamp until the wire feels uncomfortably hot to the fingers when held *not more* than half an inch from the button. The flat face of the instrument is then rapidly and lightly applied, by repeated touches, over the course of the affected nerve, or over the part suffering from rheumatism or from neuralgic pain. If lightly applied, and almost instantly removed to another portion of the skin, it merely produces a white, polished, glistening appearance, without raising a blister or exciting more than slight pain, and it leaves no scar. A *flat* face to the instrument is important, that no pressure may be requisite for obtaining the whole effect; whilst, if the face is convex, only a small portion of it will come in contact with the skin unless considerable pressure is used. The whole operation does not generally occupy more than a minute, and once heating the iron usually suffices even for the whole of the loins in lumbago, or the thigh in sciatica. The cases in which it has been used are *neuralgia*, wherever situated, facial, lumbar, or sciatic; *lumbago*, *sprains*, and *paralysis;* and numerous reports attest the speedy and permanent improvement obtained by means of it. Patients have been at once freed from the recurrence of tic douloureux, and from being carried into the operator's house have walked out with ease. Sometimes two or three applications are necessary. The chief objection to its employment appears to be the uniform and marvellous success reported, which creates a suspicion that there may be a little overcolouring in the reports. I have, however, frequently used it myself, and have been surprised at the benefit resulting immediately upon its employment. I cannot entirely confirm the statements about the "*very* slight pain" produced, as it has generally been spoken of as sharp though transient, and the relief has been so great that the patients have themselves wished the iron to be reapplied on a return of the pain at a subsequent time.

Galvanic cautery. — The employment of a galvanic battery, as a means of applying the actual cautery to parts of the body difficult of access, was first, I believe, proposed by Mr. Marshall, and it has been adopted by other surgeons with advantage. It depends upon the fact, that if a powerful current of galvanic electricity is passed along a fine wire, especially a fine platinum one, the wire becomes red hot, if it is small enough and the battery is sufficiently powerful. In such cases, then, as vesico-vaginal fistula, in which it is difficult to introduce a heated wire before it has time to cool, a loop of fine platinum wire is introduced at leisure whilst it is still cold and unconnected with the battery. When every thing is properly arranged, a connection is then made with the battery, and the wire becomes red hot, and may be maintained at this temperature for any desired period. When the operation is finished, the connection with the battery is broken, and the wire becomes cold and may be withdrawn. Mr. Ellis has proposed that the platinum wire should be coiled round a slender porcelain rod, by which means it is more easily introduced, and the heat is more effectively applied. In order to attain a sufficient red heat, a powerful battery is necessary, — at least 12 good-sized pairs of plates of a Smee's battery, or 8 cells of a Groves's battery, being necessary. It is probable that this mode of operating will not extend much beyond hospital practice, the trouble and expense of the application being very great; but for further details I must refer to Marshall's paper in the Med. Chir. Trans. 1851, and to Ellis's paper in the Lancet for November, 1853, p. 503.

Acupuncture. — To the question "What is the best anodyne for a teething infant?" the answer "Cold steel in the shape of a gum lancet," is a truth expressed under the form of a pleasantry; and to describe acupuncture as an *anodyne* would be to speak in a similar strain; nevertheless its effects cannot be designated by any other title, though how it acts we are quite ignorant. The operation is exceedingly simple, and consists in pushing needles, so strong as to be free from danger of breaking, an inch or a couple of inches into the flesh in a part affected with neuralgia, and allowing them to remain there for a couple of hours or longer. In *sciatica*, *obstinate lumbago*, and other neuralgic affections, the most remarkable and speedy relief to the pain is frequently produced. This was a fashionable plan of treatment at one time, when brought into note by Dr. Elliotson; but though it is occasionally resorted to, it has now fallen into almost entire disuse. Several cases have, however, been reported by Dr. Belcombe of York within the last year or two, in which he employed two needles with success in obstinate neuralgic affections; and I have seen a patient walk without difficulty, after the insertion of three, who had been unable to straighten his back for several weeks previously, from obstinate lumbago. It is sometimes, but not always, necessary to repeat the insertion of the needles two or three times.

FERRI RAMENTURA.

Iron Filings.

Ferrum in fila tractum. Iron Wire.

Adulterations.—There is no probability of iron filings being intentionally adulterated; but if obtained from a whitesmith's shop, they are not unlikely to be accidentally mixed with copper or brass filings. They can be easily and entirely separated from these and any accidental impurities by a common magnet, which will remove the iron, whilst all other substances are left behind.

Medicinal properties and uses.—The chief purpose for which they are used is *to destroy* the small *thread worms* (Ascaris vermicularis or oxyuris). Perhaps they act by causing the evolution of hydrogen in the bowels, which kills the worms. They may also, by improving the health, lessen the undue secretion of mucus upon which the formation of worms often depends. Iron filings have been proposed as an antidote in cases of poisoning by the salts of copper, but their efficacy is probably theoretical rather than real.

Dose and administration. — They are usually mixed with treacle to a convenient degree of thickness, and a tea-spoonful may be given every night, or night and morning.

FERRI PULVIS, *D.*

Powdered Iron.

Synonyme. Quevenne's Iron. Fer réduit.

Take of Peroxide of iron,
Zinc, in small pieces,
Oil of vitriol,
Water, of each a sufficient quantity.

Introduce into a gun-barrel as much of the peroxide of iron as will occupy the length of about ten inches, confining it to the middle portion of the barrel by plugs of asbestos. Let the gun-barrel be now placed in such a furnace as is used for organic analysis, one end [redacted]

ance and a resemblance to filings, I should not condemn a specimen as either carelessly or fraudulently prepared because a *little* red oxide might be present in it. Much oxide would indicate carelessness at any rate, but as it slowly oxidises when exposed to the air, there may easily be a mixture of the two oxides, constituting the magnetic oxide, without any imputation upon the chemist preparing it.

Medicinal properties and uses. — This preparation has not at present come into much use in this country; but under the name of "Fer réduit" or "Fer réduit par hydrogène" it has been employed in France in the treatment of chlorosis and anæmia, in doses of gr. ii several times a day. It is supposed to act more favourably than other ferruginous preparations; but I am not aware of any convincing testimony in support of this supposition.

Dose. — Gr. ii made into pills, several times a day.

FERRI SESQUIOXYDUM, *L.D.E.*

SESQUIOXIDE OF IRON.

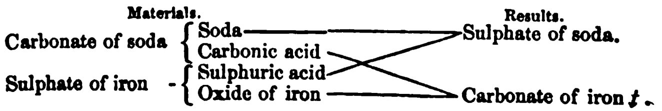
Synonyme. Ferri Oxydum Rubrum, *E.* Ferri (Sub-)carbonas, *D.* Ferri Rubigo. Crocus Martis. Colcothar. Crocus. Rouge.

Take of Sulphate of iron, four pounds.
Carbonate of soda, four pounds and two ounces (℔. v, *D. E.*).
Water, boiling, six gallons.

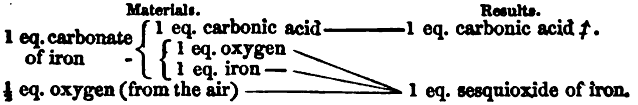
Dissolve the sulphate and carbonate, separately, in three gallons of water; then mix the liquors together, still hot, and set them by, that what is thrown down may subside. The supernatant liquor being poured off, wash this often with water, and dry it.

D. E. Collect the precipitate on a calico filter, and wash till the washings scarcely affect solution of nitrate of barytes. Dry over a vapour-bath, *E.* Dry by a heat not above 212°, *D.*

Decomposition. — When sulphate of iron and carbonate of soda, in solution, are mixed together, both are decomposed; the carbonic acid combines with the oxide of iron, and the sulphuric acid of the sulphate of iron combines with the soda to form sulphate of soda which remains in solution, whilst the carbonate of iron falls as a precipitate.

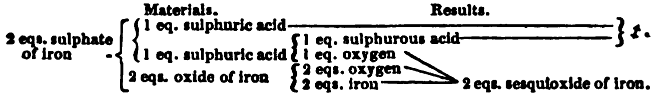


The carbonate of iron slowly subsides as a green, very bulky, hydrated precipitate. During the washing, and still more during the drying, it loses its green colour, and becomes brown or reddish-yellow, owing to the escape of carbonic acid, and the absorption of oxygen from the air, by which it is converted into sesquioxide of iron.



No specific directions are given by the London College for the mode of drying it, and considerable difference in the appearance results from the different methods by which this is effected. If it is perfectly dried in a steam-bath, it is less red than if it is nearly dried in this way, and then put into a furnace and exposed to a very high temperature.

A different method is frequently adopted as being cheaper. The sulphate of iron is first dried to expel the water of crystallisation and is afterwards heated in a furnace until acid fumes cease to be evolved. In this way the sulphuric acid is decomposed, and the iron becomes further oxidised, and converted into sesquioxide, whilst the sulphurous acid escapes as gas.



Properties. — Sesquioxide of iron has a reddish-brown or yellow colour, but no two samples are exactly alike. The higher the heat to which it has been exposed, the redder the colour. When prepared according to the Pharmacopœia it has a styptic taste; when prepared by calcination it is tasteless (*Pereira*). It generally contains a small remainder of carbonate of iron, and therefore slightly effervesces on the addition of hydrochloric acid, by which it is almost entirely dissolved. It is insoluble in water, and is not magnetic.

Composition. — Sesquioxide of iron consists of

1 eq. iron, 28; 1½ eq. oxygen, 12=$FeO^{1\frac{1}{2}}$; eq. 40, or Fe^2O^3; eq. 80, with a small and variable quantity of carbonate of iron.

Powders for which it may be mistaken. — *Precipitated tersulphuret of antimony; binoxide of mercury.* It can scarcely be mistaken for red lead, biniodide of mercury, or vermillion (bisulphuret of mercury). It is to be distinguished from the mercurial compound by being much lighter and not volatile when heated, and from the antimonial one by the difference of colour and the effect of tests.

Characters and tests. — It is dissolved by diluted hydrochloric acid almost without effervescence, and is again thrown down by potash. The strained liquor is then free from colour; and hydrosulphuric acid or ferrocyanide of potassium being added, it is not coloured.

Sesquioxide of iron is not liable to fraudulent adulterations, and the tests of the Pharmacopœia are almost unnecessary. It sometimes contains a little sulphate of soda from imperfect washing, which imparts a bitter taste to what ought to be nearly tasteless; but this is quite immaterial in a medicinal point of view.

Medicinal properties. — *Tonic*, resembling those of the ferruginous compounds generally. (See FERRUM, p. 446.) It is the least active of any of this class, owing to its insolubility.

Uses.— *Chlorosis* and *anæmial* states generally. It is, however, chiefly used in *chorea*, and in *tic douloureux*, in which it sometimes produces surprisingly good effects in a short time. Its continued employment is not of much use, if it does not quickly show a beneficial action. It sometimes fails to do any good.

Doses and administration. — Sesquioxide of iron is generally made into an electuary with treacle, but it may be suspended for a few moments in water alone. The usual dose is gr. x to ʒss; but in chorea, and especially in tic douloureux, the most outrageous doses have been given, — from ʒj to ℥ss, several times daily. I recollect having seen the report of a post-mortem examination in one of these cases, in which an immense quantity was found accumulated in the stomach and bowels, but I cannot recall the name of the authority. There is no reasonable prospect that ℥ss of so insoluble a substance will do good if ʒss or ʒj fails. The only effect will be to overload and disorder the stomach. An occasional aperient ought to be given during the administration of this medicine.

FERRI PEROXYDUM, *D.*

PEROXIDE OF IRON.

Take of Hydrated peroxide of iron, any convenient quantity.

Heat it on paper in an oven till dry to the touch, and then place it in a crucible, and heat it for a few minutes to dull redness.

By this process of the Dublin Ph. the water is simply expelled from sesquioxide of iron previously in a moist state. (See FERRI PEROXYD. HYDRAT. below.)

Medicinal properties and uses. — Same as those of Ferri sesquiox. (above).

FERRI PEROXYDUM HYDRATUM, *D.*; FERRUGO, *E.*

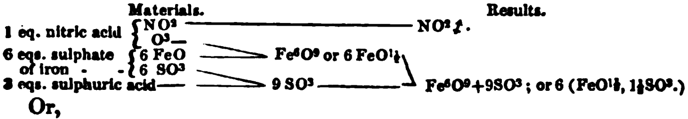
Hydrated Peroxide of Iron.

Take of Sulphate of iron, eight ounces.
Pure sulphuric acid, six fluid drachms.
Pure nitric acid, half a fluid ounce.
Solution of caustic potash, two pints.
Distilled water, twelve fluid ounces.

E. Sulphate of iron, ℥iv; Commercial sulphuric acid, fʒiijss; Nitric acid (commercial), fʒix; Stronger aqua ammoniæ, f℥iijss; Water, Oij.

To ten ounces of the water add the sulphuric acid, and dissolve the sulphate of iron in the mixture, with the aid of heat. Mix the nitric acid with the remainder of the water; and, having added the diluted acid to the solution of sulphate of iron, concentrate by boiling, until, upon the sudden disengagement of much gas, the liquid passes from a dark to a red colour. Let this be now poured into the solution of caustic potash; and, when the mixture has been well stirred, place it on a calico filter, and let the precipitate be washed with distilled water until the liquid which passes through ceases to give a precipitate with chloride of barium. Lastly, enclose the precipitate, while in the pasty state, in a porcelain pot, whose lid is made air-tight by a luting of lard, so as to prevent the loss of water by evaporation. (The directions of the Ed. Ph. are essentially the same, substituting ammonia for potash.)

Decomposition.—When sulphate of iron is heated with nitric acid, the acid gives up some of its oxygen to the iron, and changes it from oxide of iron, FeO, into sesquioxide, $FeO^{1\frac{1}{2}}$. But this new oxide requires half an equivalent more sulphuric acid; to supply which a certain quantity is directed to be added to the solution before heating it with the nitric acid. This acid, having lost part of its oxygen, is converted into binoxide of nitrogen (nitrous gas), which escapes sometimes suddenly. The solution now contains sesquisulphate of sesquioxide, or persulphate of peroxide of iron; and, on adding potash or ammonia, the alkali separates the acid, and the peroxide falls as a bulky red or orange precipitate, combined with much water. When this has been washed, to remove the sulphate of potash or ammonia, it constitutes the hydrated peroxide of iron.



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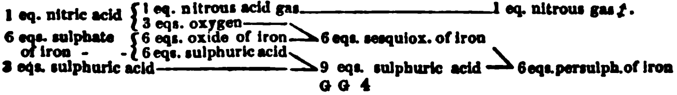
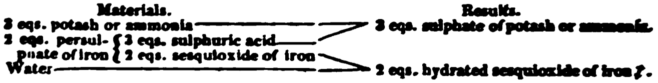


Second part of the process,


Materials.
Results.
3 eqs. potash or ammonia
2 eqs. persulphate of iron
3 eqs. sulphuric acid
2 eqs. sesquioxide of iron
Water
3 eqs. sulphate of potash or ammonia.
2 eqs. hydrated sesquioxide of iron.

Medicinal properties and uses.—There is only one purpose for which this substance is used; that is, as an antidote to poisoning by arsenic, in which the weight of testimony proves its efficacy, though there are many conflicting statements, and it is almost impossible to account for its effect.

Dose.—The efficacy depends upon a sufficiency being given, and therefore a table-spoonful ought to be swallowed every few minutes. This oxide may be prepared, extempore, on an emergency, by adding solution of ammonia to the tincture of muriate of iron, and quickly washing and pressing the precipitate.

FERRI OXYDUM (MAGNETICUM, *D.*), NIGRUM, *D. E.*

BLACK, OR MAGNETIC OXIDE OF IRON.

Take of Sulphate of iron, six ounces.
Commercial sulphuric acid, two fluid drachms and two fluid scruples.
Pure nitric acid, four and a half fluid drachms.
Stronger aqua ammoniæ, four and a half fluid ounces (instead of this, sol. of potash, twenty-seven fluid ounces, *D.*).
Boiling water, three pints.

Dissolve *half* the sulphate in half the boiling water, and add the sulphuric acid; boil; add the nitric acid by degrees, boiling the liquid after each addition, briskly, for a few minutes. Dissolve the rest of the sulphate in the rest of the boiling water; mix thoroughly the two solutions, and immediately add the ammonia (potash, *D.*) in full stream, stirring the mixture at the same time briskly. Collect the black powder on a calico filter; wash it with water till the washings are scarcely precipitated by solution of nitrate of barytes, and dry at a heat not above 180°. The Dublin Ph. directs three quarters of the sulphate to be converted into peroxide, as in FERRI PEROX. HYDRAT. p. 455., and the subsequent steps are the same as those above given.

Decomposition.—In the above case the first portion of sulphate is converted into a salt of the *per*oxide of iron (see FERRI PEROXYD. HYDR. p. 455.), and the solutions, after being mixed, contain, therefore, a salt of *per*oxide, $FeO^{1\frac{1}{2}}$, and a salt of *prot*oxide, FeO, mixed together. When an alkali (potash or ammonia) is added, it combines with the sulphuric acid, and the two oxides are precipitated together in the form of a black powder, which is strongly attracted by the magnet, and is readily dissolved by muriatic acid.

Medicinal properties and uses.—The same as those of sesquioxide of iron, p. 454., but it is thought to be more powerful, owing to the protoxide of iron contained in it. It is seldom used.

Dose.—Gr. v to ℈j.

FERRI CARBONAS CUM SACCHARO, *L. D. E.*

CARBONATE OF IRON WITH SUGAR.

Synonyme. Ferri Carbonas Saccharatum, *D. E.*

Take of Sulphate of iron, four ounces.
Carbonate of soda, four ounces and a quarter (℥v, *D. E.*).
Sugar, two ounces.
Boiling distilled water, four pints.

Dissolve the sulphate and carbonate separately, in two pints of water. Mix the solutions, still hot, together, and set by that the carbonate of iron may subside. Then, having poured off the supernatant liquid, wash the precipitated carbonate frequently with water. To this, add the sugar dissolved in two fluid ounces of water, and evaporate the mixture in a water-bath, until the powder is dry. Keep it in a well-stopped vessel.

The Edinburgh and Dublin Colleges direct the precipitate of carbonate of iron, after being slightly washed, to be squeezed with as little delay as possible, and mixed with the sugar, previously in a fine powder.

Decomposition.—For the formation of the carbonate of iron, see FERRI SESQUIOX. p. 452. Sugar possesses the property of preventing the absorption of oxygen, when combined with carbonate of iron, and in this case it is combined with it to preserve the carbonate in the state of carbonate of the *pro*toxide of iron, and prevent the metal from becoming peroxidised. The salts of protoxide of iron are generally more powerful than those of the peroxide. As the carbonate absorbs oxygen quickly, even during the washing, the directions of the Dublin and Edin. Coll. for squeezing out the water with as little delay as possible, are better than those of the London Coll., which simply desires that the precipitate shall subside; but it is so bulky and settles so slowly, that a good deal of oxygen is absorbed before this is completed.

Properties.—Saccharated carbonate of iron is a coarse powder of a dirty dark bottle-green colour. It effervesces freely with dilute muriatic acid, and dissolves in it, the solution answering to the tests for iron. It keeps well for almost any length of time.

Medicinal properties and uses.—Its properties are those of iron tonics generally, and it is used in the same cases as ferri sesqui-oxyd. p. 452., but being much more active, the dose is proportionally smaller.

Dose. — Gr. ij to gr. v or gr. x. Christison says, gr. v to gr. xxx. I have frequently found that five grains have produced headache; and have never required, and have therefore never used, the larger doses which he mentions.

FERRI SULPHAS, *L. D. E.*

SULPHATE OF IRON.

Synonyme. Sal Martis. Ferrum Vitriolatum. Copperas. Green Vitriol.

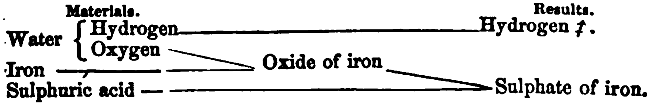
Take of Commercial sulphate of iron, four pounds.
Sulphuric acid, a fluid ounce.
Iron wire, an ounce.
Distilled water, four pints.

Mix the acid with the water, and add the sulphate and iron to them; then apply heat, frequently stirring, until the sulphate is dissolved. Strain the solution whilst still hot, and set aside that crystals may form. Evaporate the liquid which is poured off, that it may again pass into crystals. Dry them all.

The Edinburgh College merely directs the crystals to be dissolved in water acidulated with a little sulphuric acid, and recrystallised.

D. Take of iron wire, ℥iv; Sulphuric acid, f℥iv; Water, Ojss. Dissolve the iron in the acid mixed with the water, applying heat, when bubbles of gas cease to escape; filter; evaporate, that crystals may form, and dry them upon a porous brick.

When iron is immersed in water, with exposure to the air, it *slowly* becomes oxidised. When, however, it is immersed in dilute sulphuric acid, it is *rapidly* oxidised at the expense of the water, and the hydrogen from the decomposed water is set free. The sulphuric acid combines with the oxide of iron, and forms sulphate of iron.



Commercial sulphate of iron is sometimes brown instead of green, owing to the absorption of oxygen, and its conversion from the green protoxide to the brown or red peroxide. When it is exposed to *nascent* hydrogen, or hydrogen at the moment of being set free, the hydrogen combines with the excess of oxygen, and forms water, whilst the peroxide is reduced again to the state of protoxide. The London College, therefore, directs the solution of the iron in the sulphuric acid for the sake of the hydrogen, which is evolved. The Dublin College cares nothing about the hydrogen, but directs the process for the sake of the sulphate of iron, which remains.

Properties.—Sulphate of iron forms green crystals, which soon become yellow at the angles, from exposure to the air. The *primary* form is an *oblique rhombic prism*, and the crystals are generally exactly similar in size and figure to those of citric acid, as drawn at page 78. They are readily soluble in water, and the solution, which is at first green, rapidly becomes brown, and soon deposits a sediment of brown or yellow subsulphate of sesquioxide of iron. On this account, both the crystals and the solution ought to be carefully excluded from the air. When exposed to a moderate heat, they lose most of their water of crystallisation, and become white and powdery. At a high temperature they are decomposed, and converted into the sesquioxide, as is more fully described under that article, p. 452.

Composition.—Crystals of sulphate of iron consist of

1 eq. oxide of iron, 36; 1 eq. sulphuric acid, 40; 7 eqs. water 63 $=FeO,SO^3,7HO$; eq. 139; or

1 eq. iron, 28; 1 eq. oxysulphion, 48; 7 eqs. water, 63 $=Fe,SO^4,7HO$; eq. 139;

forming oxysulphion of iron, or sulphatoxide of iron. (See SALTS, p. 383.)

Characters and tests.—Bluish-green. It is dissolved by water.

Adulterations.—Sulphate of iron is not likely to be purposely adulterated; but owing to careless preparation, or to exposure to the air, it may contain sesquioxide of iron. If this is the case, its angles will be yellow or brown, and it will have lost its translucency. If the crystals are clear green and translucent, they may generally be considered to be pure.

Salts for which it may be mistaken.—None. The *green* colour of its crystals distinguishes it from every salt contained in the Pharmacopœia.

Medicinal properties and uses.—*Tonic; emmenagogue.* It agrees in its properties with those of the compounds of iron generally. Being in the state of protoxide, it is more active than the sesquioxide, and is therefore given in smaller doses. It does not exert so much influence over periodic pains as that preparation, but is more frequently given as a general tonic, and in cases of uterine derangement. It does not possess any directly emmenagogue powers, but frequently occasions the establishment of the menstrual discharge in *chlorosis*, by restoring the general health. It is often used as an astringent application to ringworm of the scalp, in the form of common black writing ink, which is a compound of sulphate of iron and infusion of galls, and on the Continent a solution of the common sulphate is frequently applied as a lotion in erysipelas (1 part in 15 of water). It blackens the fæces more than any of the preparations of iron.

Dose and administration.—Sulphate of iron is generally given in the form of mixture in the formula "mist. ferri comp.," or in that of pills. In the latter, it ought to be very finely powdered, and compounded with treacle and some fine powder, as myrrh or liquorice. In the pil. ferri co., of which it forms a constituent, it is converted into carbonate. They ought not to be prepared long before being used. The usual dose is gr. ij to gr. v; but in the following form it may be given with great advantage in chlorosis, in much larger doses, viz. in such as correspond with gr. x or gr. xv of the crystallised sulphate.

Incompatibles.—Sulphate of iron should not be prescribed with any bitter extract in the form of pill, nor with bitter infusions, except those of calumba and quassia. Sulphuric acid may be given in conjunction with it, but nitric acid converts it into a persalt, and should therefore be avoided. Alkalies and alkaline carbonates decompose it; but they are sometimes intentionally combined with it, as in the pil. ferri co. and the mist. ferri co.

FERRI SULPHAS EXSICCATUM, *D.E.*

Dried Sulphate of Iron.

Take of sulphate of iron any convenient quantity, and heat it moderately (400°, *D.*), in a porcelain vessel, till it is converted into a dry greyish-white mass, which is to be rubbed to powder.

Remarks.—By this operation, the salt merely loses its water of crystallisation, which amounts to nearly half its weight, and becomes proportionally stronger. It is found to answer better in some cases of chlorosis than the ordinary sulphate, and has been highly commended by Dr. Guy, in amenorrhœa, in preference to the undried salt.

Dose.—It may be given to the extent of gr. x to gr. xv, in pills, twice or three times a day.

FERRI SULPHAS GRANULATUM, *D.*

Granulated Sulphate of Iron.

Proceed at first as in making sulphate of iron, but instead of evaporating and crystallising the solution, filter it whilst hot into rectified spirit, and stir it constantly, that, as it cools, the sulphate may form minute granular crystals.

Medicinal properties and uses.—I am not aware of any particular, except the expense, in which this preparation differs from ordinary sulphate of iron. Its properties, uses, and doses are the same.

FERRI PERCYANIDUM.

PERCYANIDE OF IRON. (Not Off.)

Synonyme. Ferrosesquicyanide of Iron. Ferri Cyanuretum. Prussian (or Berlin) Blue.

Preparation.—This compound is manufactured largely for commercial purposes, and was formerly placed in the Materia Medica by the London College. It is now expunged, but is introduced in this place for the purpose of explaining one of the tests for prussic acid. It is made by fusing animal matters mixed with pearlash at a high temperature, in an iron retort, by which an impure ferrocyanide of potassium is obtained. (See POTASSII FERROCYANIDUM.) To a solution of this salt is added a mixture of sulphate of iron and alum; a dirty green precipitate falls, which on exposure to the air becomes blue, and when washed and dried constitutes ordinary Prussian blue.

Properties.—Prussian blue is in irregular lumps of an intensely blue colour, which, when broken, have a superficial coppery hue, resembling that of broken indigo. It is distinguished from indigo by losing this tint, on rubbing it with the nail (*Pereira*). It is tasteless and inodorous; insoluble in water, alcohol, or *dilute* hydrochloric, sulphuric, or nitric acid. *Concentrated* nitric acid decomposes it; hydrochloric acid dissolves its iron; and sulphuric acid dissolves it entirely, and forms a white pasty mass, from which the Prussian blue is precipitated on the addition of water. When boiled with solution of potash it forms ferrocyanide of potassium; when boiled with binoxide of mercury and water, it forms bicyanide of mercury; and when exposed to a high temperature it is decomposed, and yields water, hydrocyanate of ammonia, carbonate of ammonia, and carburet of iron.

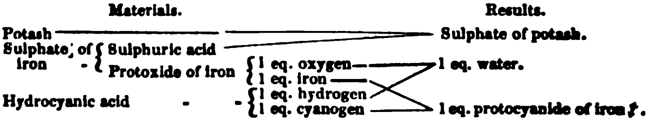
Composition.—Commercial Prussian blue always contains some peroxide of iron and alum, and frequently uncombined ferrocyanide of potassium. It also contains some water which cannot be separated without decomposing it. When separated from all impurities, it consists of

9 eqs. cyanogen, 26 × 9, 234; 7 eq. of iron, 28 × 7, 196=eq. 430.

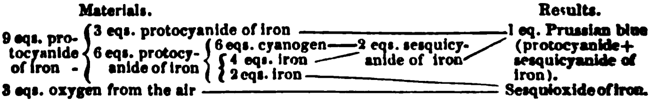
These equivalents are supposed to be arranged so as to form a double salt, which, if named at length, would be termed ferrocyanide of sesquicyanide of iron. It consists of

3 eqs. cyanide of iron, 3 FeCy, 162; 2 eqs. sesquicyanide of iron, 2 Fe^2Cy^3, 268=3 FeCy,2Fe^2Cy^3; eq. 430.

A thorough knowledge of this formula is essential to the right understanding of the iron test for hydrocyanic acid. (See ACID. HYDROCYAN.—*Tests*, p. 93.) To the solution of that acid, a solution of *proto*sulphate of iron is added, and afterwards a few drops of solution of potash. A pale green precipitate is thrown down, which is to be redissolved by the addition of a few drops of hydrochloric acid. A light greenish-blue colour is now perceived, which rapidly deepens till it acquires the colour of Prussian blue. In the first instance *proto*xide of iron was thrown down by the potash, and the whole of the hydrocyanic acid formed *proto*cyanide of iron and water with this.



We see thus that the whole of the cyanogen forms *proto*cyanide of iron, and yet some *sesqui*cyanide is necessary for the formation of Prussian blue, and the success of the test. Now although sesquicyanide of iron would never form protocyanide from exposure to air, yet the reverse readily takes place; and some of the *protocy*anide is quickly converted into *sesqui*cyanide, by the oxidation of part of the iron, which thereby leaves less iron in combination with the remaining cyanogen. Thus,


Materials.
Results.
9 eqs. protocyanide of iron
3 eqs. protocyanide of iron
6 eqs. protocyanide of iron
6 eqs. cyanogen
4 eqs. iron
2 eqs. iron
2 eqs. sesquicyanide of iron
3 eqs. oxygen from the air
1 eq. Prussian blue (protocyanide + sesquicyanide of iron).
Sesquioxide of iron.

The addition of the hydrochloric acid is merely to dissolve any excess of oxide of iron which might obscure the colour of the Prussian blue. It is thus seen why the colour at first is very pale (protocyanide of iron), but gradually deepens as the action of the air causes the formation of the sesquicyanide, and thereby of the desired result.

Substances for which it may be mistaken.— Indigo. It is distinguished from this by its greater specific gravity, indigo being very light: this is, however, a very imperfect test. The removal of the coppery colour, on rubbing it with the nail, further distinguishes it. When boiled with solution of potash it forms yellow ferrocyanide of potassium; and when boiled with binoxide of mercury, its own blue colour and the red colour of the binoxide disappear, and bicyanide of mercury is formed.

Medicinal properties and uses.— It is not poisonous, and is not used internally as medicine.

FERRI IODIDUM, *D.E.*

IODINE OF IRON.

Take of Pure iodine, one ounce.
Iron filings, or turnings, or wire, half an ounce.
Distilled water, five fluid ounces.

Introduce the iodine, iron, and four ounces of the water into a Florence flask, and having heated the mixture gently for ten minutes, boil until the solution loses its red colour. Pass the liquid now through paper, into a second flask, washing the filter with the remaining ounce of water, and, by means of a regulated heat, boil down the liquor until a drop of it taken out on the end of an iron wire solidifies on cooling. When the flask has assumed the temperature of the air, let the iodide of iron be extracted from it (by breaking the flask if necessary), and after it has been submitted to powerful pressure, enveloped in blotting-paper, let it be enclosed in a well-stopped bottle, *D.* The directions of the Edinburgh College are essentially the same, except that the solution, containing some metallic iron, is ordered to be evaporated in a dish, surrounded by quicklime, in a hot-air closet or otherwise, without free access of the air, until the iodide remains dry.

Process.— This is a simple case of combination between the iron and the iodine, and subsequent evaporation of the solution. This must be done quickly and without exposure to the air, as it is a salt which very rapidly oxidises, and also attracts moisture, if not immediately put into well-closed bottles. To compensate for the loss of iron by oxidation during the evaporation, the Edinburgh College directs a portion of iron wire to be present, with which the iodine set free from the oxidised iron immediately combines, and the solution is thus retained free from uncombined iodine.

Test.—Entirely soluble in water, or nearly so, forming a greenish solution, *E.*

Iodide of iron is not liable to fraudulent adulteration, and the only impurity likely to be present is sesquioxide of iron (from exposure to the air) and iodine, set free from the iron. It is almost impossible to prevent slight oxidation, and, therefore, the Ed. Ph. says, that it is only almost entirely soluble in water.

Composition.— Crystallised iodide of iron consists of

1 eq. iron, 28; 1 eq. iodine, 126; 5 eqs. water, 45 = $FeI,5HO$; eq. 199 (*Phillips*).

Medicinal properties.— *Tonic* and *alterative.* It is a valuable compound of iodine and iron, and produces the characteristic effects of both, uniting in an excellent manner the tonic powers of the iron with the peculiar properties of the iodine. The chief drawback to its utility is its liability to spoil; but this may be prevented by keeping a portion of iron wire in the solution containing it.

Uses.— Iodide of iron is chiefly used in *scrofulous affections*, and is beneficial even when they have proceeded so far as to produce abscesses and disease of the heads of bones. I have seen it produce good effects in *chronic rheumatism*, when accompanied with general debility. In *tabes mesenterica*, and in *atonic amenorrhœa*, it has often proved of service; but it is not so useful in anæmia, when the catamenia are not irregular (*Pereira*). It has often been useful in various forms of secondary syphilis.

Dose and administration. — Gr. j to gr. iij, gradually increased to gr. x. It has been given in much larger doses, but their utility is very questionable. It may be given in water, flavoured with orange or lemon peel.

Incompatibles. — Acids and alkalies, and bitter infusions and tinctures, except those of quassia and calumba.

SYRUPUS FERRI IODIDI, *L.D.E.*

Syrup of Iodide of Iron.

Take of Iodine, an ounce.
Iron wire, three drachms.
Sugar, ten ounces.
Distilled water, twelve fluid ounces, or sufficient.

Mix the iodine and iron in eight fluid ounces of the water, and heat them until the liquor assumes a greenish colour; then strain. Evaporate the solution to about four fluid ounces, and add the sugar. Lastly, when the syrup has cooled, add sufficient water to fill a fifteen ounce measure, and keep it in a well-stopped black glass bottle.

The actual quantities are different in the Phs. Dub. and Ed., but the proportions are the same, except that the Ph. Dub. uses syrup instead of sugar. It also orders the solution to be filtered whilst hot into a bottle containing the syrup. The Edinburgh College directs the first solution to be evaporated before filtration, rather than after as in the Ph. L.

Process. — This is a case of simple combination, but the addition of the sugar is important, as it prevents the absorption of oxygen from the air, and so preserves the solution as iodide of iron for an indefinite period.

Medicinal properties and uses. — The same as those of iodide of iron.

Dose. — Twelve minims of the syrup contain about one grain of iodide of iron in each of the Pharmacopœias. The dose is therefore ♏v to fʒj ; or fʒij, twice or thrice daily.

FERRI SULPHURETUM, *D.E.*

Sulphuret of Iron.

E. The best sulphuret of iron is made by heating an iron rod to a full white heat in a forge, and rubbing it with a roll of sulphur over a deep vessel filled with water to receive the fused globules of sulphuret which form. An inferior sort, good enough, however, for pharmaceutical purposes, is obtained by heating one part of sublimed sulphur and three of iron filings, in a crucible in a common fire, till the mixture begins to glow, and then removing the crucible and covering it, until the action, which at first increases considerably, shall come to an end. (The Dublin directions are just the same.)

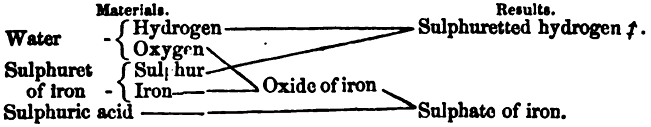
Process. — This is a simple case of combination, at the high temperature employed, between the sulphur and the iron.

Composition.—Pure sulphuret of iron consists of

1 eq. sulphur, 16; 1 eq. iron, 28=FeS; eq. 44;

but common sulphuret always contains an excess of sulphur.

Properties and uses. — It is nearly soluble in dilute sulphuric acid, and forms sulphate of iron with an escape of sulphuretted hydrogen. It is merely introduced into the Pharmacopœia as a means of obtaining this gas for pharmaceutical purposes. It is not used medicinally.



When dilute sulphuric acid is poured upon sulphuret of iron, the oxygen of the water combines with the iron, forming oxide of iron, which combines with the sulphuric acid and forms sulphate of iron. The hydrogen of the water combines with the sulphur, and flies off as sulphuretted hydrogen, or hydrosulphuric acid.

TINCTURA FERRI SESQUICHLORIDI, *L. D. E.*

TINCTURE OF SESQUICHLORIDE OF IRON.

Synonyme. Tinctura Ferri Muriatis, *E.* Liquor Ferri Muriatis. Tinctura Martis in Spiritu Salis.

Take of Sesquioxide of iron, six ounces.
Hydrochloric acid, one pint.
Rectified spirit, three pints.

Mix the sesquioxide with the acid, and digest it in a sand-bath, frequently stirring, until it is (almost, *E.*) dissolved; then add the spirit to the solution, when cool, and strain.

Decomposition. — Sesquioxide of iron has been already mentioned as containing a small portion of carbonate of protoxide of iron. On the addition of hydrochloric acid, the carbonic acid escapes, giving rise to a slight effervescence. The other changes produced are the combination of 1½ eq. of chlorine, from 1½ eq. hydrochloric acid, with 1 eq. of iron, contained in 1 eq. of sesquioxide; the 1½ eq. of oxygen set free, combines with 1½ eq. of hydrogen from the decomposed hydrochloric acid, and forms water.

Materials.		Results.
1½ eq. hydrochloric acid -	1½ eq. hydrogen	1½ eq. water.
	1½ eq. chlorine	
1 eq. sesquioxide of iron -	1½ eq. oxygen	
	1 eq. iron ——	1 eq. sesquichloride of iron.

As some of the iron is in the form of protoxide, a small portion of protochloride of iron is formed at the same time. When spirit is added, the excess of acid, which is always present, converts a portion of it into hydrochloric ether (*Pereira*). The remainder of the spirit simply dissolves the sesquichloride of iron. The sesquioxide of iron is never entirely dissolved, in making this preparation.

D. Take of iron wire, ℥viii; Pure muriatic acid, Oii; Pure nitric acid, f℥xviii; Distilled water, Oj; Rectified spirit, Ojss. Dilute the muriatic acid with the water, and dissolve the iron in it with the aid of a gentle heat. Next add the nitric acid in successive portions, and then evaporate at a gentle heat until the solution is reduced to one pint. Finally, mix this in a bottle with the spirit, and, after the mixture has stood for twelve hours, draw off the clear liquor. Sp. gr. 1·237.

Process.— In the first stage of this process, the chlorine of the muriatic acid combines with the iron, forming protochloride of iron, and hydrogen escapes.

Materials.		Results.
1 eq. hydrochloric acid -	1 eq. hydrogen	1 eq. hydrogen ↑.
	1 eq. chlorine	
1 eq. iron		1 eq. protochloride of iron.

In order to understand the effect of the subsequent heating with the nitric acid, it will be best to call this muriate of oxide of iron, instead of chloride. Thus,

$FeCl + HO$ (chloride of iron and water) $= FeO,HCl$ (oxide of iron and muriatic acid).

When this is heated in nitric acid, the acid is decomposed, and part of its oxygen combines with the iron and converts it into sesquioxide, whilst the remainder of the oxygen and the nitrogen of the acid fly off as nitrous gas. There is an excess of hydrochloric acid in the solution, and the sesquioxide combines with an additional half equivalent of the acid and forms sesquichloride of iron: see diagram, above, explaining the conversion of sesquioxide into sesquichloride of iron.

Properties.—This tincture has a reddish-yellow colour; is always acid to test paper; stains the skin yellow; and has a styptic taste. Its smell resembles that of hydrochloric ether. When mixed with some bitter infusions or tinctures it immediately makes them black, owing to the formation of tannate of iron. A fluid ounce contains thirty grains of sesquioxide of iron. Its strength is, however, in no degree proportioned to the quantity of iron thus contained in it. When long kept, in a flint glass bottle, it deposits a yellow crust upon the interior, which adheres with great firmness.

Composition.—Tincture of sesquichloride of iron consists essentially of

1 eq. of iron, 28; 1½ eq. of chlorine, 54 = $FeCl^{1\frac{1}{2}}$; eq. 82;

dissolved in spirit. In addition to this, there is a small quantity of hydrochloric ether (*Pereira*), besides an excess of hydrochloric acid, and a little protochloride of iron. The variable proportions of these ingredients occasion a variety in the colour of different specimens of this tincture.

Tests.—Its sp. gr. is ·992. A fluid ounce of it throws down nearly thirty grains of sesquioxide of iron on the addition of (solution of) potash.

Adulterations.—It is not likely to be either accidentally or wilfully adulterated, unless by the employment of dilute instead of rectified spirit, which, in a medicinal point of view, is of little consequence.

Medicinal properties.— *Tonic; emmenagogue; styptic.* It agrees in its properties with the compounds of iron generally, and is perhaps more used than any other, as it is an active preparation, is not liable to spoil, and the dose is easily apportioned. In addition to its tonic properties, it exerts a remarkable influence over the urinary organs, and in some instances appears to act as a diuretic. It sometimes produces symptoms of irritation, owing probably to the excess of acid; and I lately saw a case of intractable diarrhœa induced by its long continued employment. When the bowels are inclined to diarrhœa, its use requires caution.

Uses.—In *scrofula*, and in most cases of debility; and in *chlorosis*, and *menorrhagia*, it is of much service. In *dropsy*, also, in which the health is much impaired, and in some cases of *albuminuria, with enfeebled constitution*, it is of great value when combined with tincture of digitalis. In *dysuria*, and *spasmodic retention of urine*, it frequently affords relief, when given in doses of ♏x, every ten minutes, until nausea or relief is produced. In *hæmaturia*, especially when this is dependent upon disease of the kidney, it produces good effects. In *erysipelas*, at whatever age it may occur, Mr. Hamilton Bell employs this tincture of iron, and speaks of its efficacy in high terms. He uses, for an adult, ♏xv every two hours in a mild case, or ♏xxv or ♏xxx in severer cases, no matter what may be the fever or delirium present.* Pereira has found it succeed in the *latter stage of gonorrhœa*, when given in combination with tincture of cantharides, after other remedies have failed.

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* Ranking's Abs. vol. xiv. p. 91.

It is sometimes used locally as a styptic to destroy *venereal warts*; and to check obstinate bleeding after the extraction of a tooth, or in any other case, in which a styptic is likely to be useful.

Dose and administration. — It is always given in the form of mixture, in doses varying from ♏v to ♏xv, gradually increased by some practitioners to f℥ss or f℥j.

Incompatibles.—Most bitter infusions or tinctures; but it may be advantageously given with infusion of quassia, or infusion or tincture of calumba; and although with tincture of digitalis it forms a dark colour, it is still a very valuable combination. Tincture of lavender is not a good aromatic to combine with it, as it becomes black, and all the preparations of cinnamon are incompatible.

FERRI AMMONIO-CHLORIDUM, *L.*

AMMONIO-CHLORIDE OF IRON.

Synonyme. Flores Martiales. Ferrum Ammoniatum.

Take of Sesquioxide of iron, three ounces.
Hydrochloric acid, half a pint.
Hydrochlorate of ammonia, two pounds and a half.
Distilled water, three pints.

Mix the sesquioxide with the acid, and digest it in a sand-bath, frequently stirring it, until it is dissolved: then add the hydrochlorate, first dissolved in water; strain, and evaporate the solution until the salt is dry. Rub this into a powder.

Decomposition.—In this, as in the last preparation, sesquichloride of iron is formed, which is mixed with the solution of hydrochlorate of ammonia. No change takes place on mixing them, and they are simply evaporated together to dryness.

Properties. — It has an orange or reddish colour, but is liable to variety in this respect. It does not undergo any chemical change on exposure to the air, but attracts moisture and becomes damp. It is soluble in water, and partially so in alcohol. It is usually seen in small crystalline grains. It has a sharp, saline, styptic taste, but no smell.

Composition. — It is a variable mixture, consisting of about 15 per cent. of sesquichloride of iron, and 85 per cent. of hydrochlorate of ammonia.

Characters and tests.—In powder; of an orange colour; it is dissolved by proof spirit and by water; either solution emits ammonia on the addition of potash, and throws down about 7 grains of sesquioxide of iron from 100 grains of this salt.

Adulterations.—It is not liable to adulteration.

Salts for which it may be mistaken.—Litharge; iodide of lead; binoxide or iodide of mercury. If, however, it is examined side by side with these, its colour and other characters distinguish it in an instant.

Medicinal properties and uses. — It is a preparation of little utility; or, at any rate, is very little used. It is *tonic*, *emmenagogue*, and *deobstruent.* The presence of the hydrochlorate of ammonia renders it aperient, if taken in large doses. It is chiefly used for the removal of chronic non-malignant tumours, in feeble or strumous habits.

Dose and administration. — It is usually given in the solid form, in doses from gr. iv to gr. xv or gr. xx.

Incompatibles. — Alkalies and their carbonates; and bitter infusions, except those of quassia and calumba.

TINCTURA FERRI AMMONIO-CHLORIDI, *L.*

TINCTURE OF AMMONIO-CHLORIDE OF IRON.

Take of Ammonio-chloride of iron, four ounces.
Proof spirit,
Distilled water, of each, half a pint.
Dissolve, and strain.

Characters and tests. — A fluid ounce of this (tincture) throws down 6·8 grains of sesquioxide of iron on the addition of potash.

In the Pharmacopœia itself the quantity mentioned is "a pint" instead of half a pint. The change has been made on the authority of Mr. Phillips, who says that he is authorised by the compilers of the Pharmacopœia to state that "half" was accidentally omitted. 5·8 grains has been changed to 6·8 on the authority of Mr. Denham Smith.

Medicinal properties and uses.—See FERRI AMM.-CHLORID. above.

Doses.—♏xxx to f℥ij, or more.

TINCTURA FERRI ACETATIS, *D.*

TINCTURE OF ACETATE OF IRON.

Take of Sulphate of iron, eight ounces.
Distilled water, half a pint.
Pure sulphuric acid, six fluid drachms.
Pure nitric acid, half a fluid ounce.
Acetate of potash, eight ounces.
Rectified spirit, four pints.

To nine ounces of the water add the sulphuric acid, and in the mixture, with the aid of heat, dissolve the sulphate of iron. Add, next, the nitric acid, first diluted with the remainder of the water, and evaporate the resulting solution to the consistence of a thick syrup. Dissolve this in two pints, and the acetate of potash in the remaining two pints of the spirit; and, having mixed the solutions and shaken the mixture repeatedly in a large bottle, let the whole be thrown upon a calico filter. When any further liquid ceases to trickle through, subject the filter, with its contents, to expression; and, having cleared the turbid tincture thus procured, by filtration through paper, let it be added to that already obtained. The sp. gr. of this tincture is ·891.

Process.—By the joint action of sulphuric and nitric acids, sulphate of iron (*proto*-sulphate of the *protoxide*) is converted into persulphate (*sesqui*- or *per*sulphate of the *sesqui*- or *peroxide*). (See Ferri Peroxyd. Hydrat. p. 455.) This is to be dissolved in the spirit and then mixed with the acetate of potash, also dissolved in spirit. On mixing them, double decomposition takes place: the acetic acid leaves the potash, and combines with the sesquioxide of iron, whilst the sulphuric acid combines with the potash, and forms sulphate of potash, which is not soluble in spirit and is therefore precipitated. The liquid which filters from this is the solution of acetate of iron in the spirit.

Medicinal properties and uses.—It is supposed to be milder and more uniform in its operation than some other preparations of iron, but it is very little used in England. In Ireland it is a favourite form for the administration of iron tonics.

Dose.—♏xx to f℥ij.

FERRI PERNITRATIS LIQUOR, *D*.

Solution of Pernitrate of Iron.

Take of Fine iron wire, free from rust, one ounce.
Pure nitric acid, three fluid ounces.
Distilled water, a sufficient quantity.

Into the acid, first diluted with sixteen fluid ounces of the water, introduce the iron wire, and leave them in contact until gas ceases to be disengaged. Filter the solution, and to it add as much water as will make its bulk a pint and a half. The sp. gr. of the solution is 1·107.

Medicinal properties and uses.—It is *tonic*, like all the preparations of iron, but is chiefly used as an *astringent* in *chronic mucous diarrhœa*, with emaciation and loss of appetite. Montgomery, of Dublin, uses it in chronic mucous discharges from the vagina, in which case he thinks it superior to any other ferruginous preparation (*Neligan*).

Dose.—♏x to ♏xxx.

FERRI AMMONIO-CITRAS, *L. D.*

AMMONIO-CITRATE OF IRON.

Take of Sulphate of iron, twelve ounces.
Carbonate of soda, twelve ounces and a half.
Citric acid, six ounces.
Solution of ammonia, nine fluid ounces.
Boiling distilled water, twelve pints.

Dissolve the sulphate and carbonate, separately, in six pints of water. Mix the solutions while still hot, and set aside that what is precipitated may subside. The supernatant liquid being poured off, wash this frequently with water, and, having added the acid, dissolve it with the aid of heat. Afterwards, when it has cooled, the ammonia being mixed with it, evaporate the solution to the thickness of a syrup; dry this, thinly spread out upon smooth porcelain tiles, with a gentle heat. Let it be kept in a well-stopped vessel.

The Dublin process is similar to this, except that "the sulphate of iron is to be converted into hydrated peroxide of iron," as directed in the formula for this oxide (see p. 455.); and the oxide so obtained is to be dissolved in the citric acid. To the solution, ammonia, in slight excess, is to be added, and the resulting solution is to be evaporated as above.

Process.—In the first part of the London process, carbonate of iron is formed, which ought theoretically to be converted into sesquioxide during the washing. (See FERRI SESQUIOX. p. 452.) In practice, however, it remains almost entirely as carbonate; and, if made according to the London directions, the salt is not a citrate of the sesquioxide, but of the protoxide of iron.* The Dublin process is therefore better, as it ensures the iron being in the form of sesquioxide. This oxide, when obtained, is dissolved by the citric acid, which is in sufficient quantity to form a bicitrate. On the addition of the ammonia, half the acid combines with it and forms the desired salt.

Composition.—Ammonio-citrate of iron consists of citrate of ammonia, and citrate of sesquioxide of iron, sometimes mixed with a portion of citrate of protoxide of iron.

Characters and tests.—It is dissolved by water. The solution does not change the colour of litmus or turmeric, nor does it become blue on the addition of ferrocyanide of potassium; but either potash or lime-water being added, it throws down sesquioxide of iron, and emits ammonia. From 100 grains, dissolved in water, about 34 grains of sesquioxide of iron are thrown down on the addition of potash.

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* Mr. Abraham, Chem. Soc. Liverpool.

Ammonio-citrate of iron is not likely to be purposely adulterated, but it may contain an excess of citric acid from careless manufacture, in which case it would redden litmus paper.

Ammonio-citrate of iron does not crystallise, but it forms minute scales of a brilliant deep red colour, which are easily soluble in water. It has a sweetish, not disagreeable taste.

Another preparation, not unlike this, only without ammonia, and termed simply, citrate of iron, was introduced into practice about the same time as this, but it is not so easily soluble in water, and is not now used medicinally.

Medicinal properties and uses.—It is *tonic* and *emmenagogue*, like all the compounds of iron, and possesses the advantage of being an elegant, not unpleasant form of this remedy. It is used in all the cases in which iron is prescribed, but is especially valuable for delicate women and children, owing to its mildness and the absence of disagreeable taste.

Dose.—Gr. iv. to gr. xv.

FERRI ET QUINÆ CITRAS. (Not Off.)

Citrate of Quinine and Iron.

This preparation is not contained in any of the Pharmacopœias, but is in general use in practice. The following formula is given by Professor Redwood[*]; but different manufacturers adopt different methods.

Take of Crystallised citric acid, six parts.
Clean iron filings, or small nails, three parts.
Quinine, recently precipitated, one part.
Water, a sufficiency.

Dissolve the citric acid in twenty times its weight of water, add the iron, and apply a gentle heat until effervescence has ceased, and no more iron is dissolved, renewing the water from time to time as it evaporates: then add the quinine, continue the application of the heat for some minutes; filter the solution, and evaporate it with a gentle heat to a syrupy consistence; spread this out on earthenware dishes, and dry it in a stove. When dry, it will separate from the dishes in scales.

Remarks.—Preparations of the above name are liable to vary in the proportions of citrate of iron and citrate of quinine which they contain, as there is no officinal, authorised formula.

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[*] Gray's Supplement.

Medicinal properties and uses.—Citrate of iron and quinine combines the properties of both these substances, and is an elegant and valuable tonic.

Dose.—Gr. iij to gr. v; in pills or solution.

FERRI POTASSIO-TARTRAS, *L. D. E.*

POTASSIO-TARTRATE OF IRON.

Synonyme. Potassio-tartrate of Iron. Ferrum Tartarizatum, *D. E.*

Take of Sulphate of iron, four ounces.
Sulphuric acid, half a fluid ounce.
Nitric acid, a fluid ounce.
Solution of ammonia, ten fluid ounces.
Bitartrate of potash, powdered, two ounces.
Distilled water, four gallons.

Dissolve the sulphate in a pint of the water with the sulphuric acid; then, heat being applied, add the nitric acid by degrees. Boil down the solution to the consistence of a syrup, and mix it with the remaining water. Then add the ammonia to throw down the sesquioxide of iron; wash this, and set it aside for twenty-four hours; then heat the bitartrate, mixed with half a pint of distilled water, to 140°, and having poured off the supernatant liquid from the moist sesquioxide, add the latter to the bitartrate by degrees. Separate by a linen (filter) what cannot be dissolved of this sesquioxide, and evaporate the clear liquid until the salt is dry.

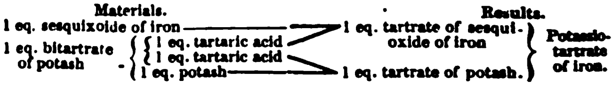
It is also advisable to dry the potassio-tartrate of iron in the same way as the ammonio-citrate of iron.

D. Take of Sulphate of iron, ℥viii; Bitartrate of potash, ℥v.

E. Sulphate of iron, ℥v; Bitartrate of potash, ℥v et ʒj; Carbonate of ammonia, in fine powder, a sufficiency.

The Ed. and Dub. Colleges simply order the sulphate of iron to be converted into a hydrated peroxide, as is directed under that head (see p. 455.), instead of repeating the directions. In the Ph. Ed., if the solution remains acid after boiling the sesquioxide with the cream of tartar, carbonate of ammonia is to be added as long as effervescence continues.

Process.—In the first part of this process the sulphate is converted into hydrated sesqui or peroxide of iron (see p. 455.), which is then boiled with cream of tartar (bitartrate of potash), the moist oxide easily combining with the second eq. of tartaric acid, and forming tartrate of sesquioxide of iron. This remains in solution, and in some not well-ascertained state of chemical combination with the tartrate of potash, forming a double salt, composed of tartrate of potash and tartrate of sesquioxide of iron.


Materials.
Results.
1 eq. sesquixoide of iron
1 eq. bitartrate of potash
1 eq. tartaric acid
1 eq. tartaric acid
1 eq. potash
1 eq. tartrate of sesquioxide of iron
1 eq. tartrate of potash.
Potassio-tartrate of iron.

Characters and tests.—It is dissolved by water. The solution does not change the colour of litmus or turmeric, nor does it become blue on the addition of ferrocyanide of potassium, nor does it throw down anything on the addition of any alkali. But if it is heated with potash, it throws down about 34 grains of sesquioxide of iron from 100 (of the salt).

Potassio-tartrate of iron is not likely to be fraudulently adulterated, but it may contain an excess of sesquioxide of iron, or of cream of tartar, from careless preparation. The first would be shown by its being insoluble in water; and the second by its reddening litmus paper.

Properties.—Potassio-tartrate of iron is not crystalline, but forms small, dark brown, glistening scales, which have a brownish-yellow colour when powdered; but its colour is variable, being sometimes lighter, and growing darker on exposure to the air. It becomes slightly moist in a damp air, and is soluble in water. It has no smell, and less taste than any of the preparations of iron. It is almost the only officinal preparation of this metal which is not decomposed by the addition, without heat, of alkalies or their carbonates; but the mineral acids decompose it. It ought not to be acid to test paper; and it is to guard against the accidental presence of an excess of bitartrate of potash, that the sesquicarbonate of ammonia is ordered by the Ph. Ed. to be added, if the solution is acid previous to evaporation.

Composition.—Not accurately determined. It contains tartaric acid, potash, and sesquioxide of iron, but in what exact combination or proportions is not certain.

Preparations for which it may be mistaken.—There is no officinal preparation for which it is likely to be mistaken.

Medicinal properties.—It is one of the mildest of the ferruginous compounds, and having less taste than any of the others, is better adapted for children and persons of delicate stomachs, and is less liable to cause constipation or feverishness than the others, owing to the presence of the tartrate of potash. It blackens the fæces. It possesses the advantage of being compatible in prescriptions with alkalies or their carbonates.

Uses.—It is a valuable general tonic for strumous or weakly children, and may be used in all the cases benefited by preparations of iron. It is not often used for the relief of neuralgia.

Dose.—Gr. v to ℈j in solution in water, or in syrup of sarsaparilla, which is an excellent combination for weakly children.

Incompatibles.—Bitter infusions and tinctures, except those of quassia and calumba.

VINUM FERRI, *L.*

Wine of Iron.

Take of Iron wire, an ounce.
Sherry wine, two pints.
Macerate for thirty days, and strain.

Remarks.—This is an old preparation revived, after being excluded from the Pharmacopœia for many years. During the maceration the iron becomes oxidised and then combines with the acid of the wine. It is a very mild preparation.

Dose.—fʒj to f℥ss.

FERRI VALERIANAS, *D.*

Valerianate of Iron.

Take of Valerianate of soda, five ounces and three drachms.
Sulphate of iron, four ounces.
Distilled water, one pint.

Let the sulphate of iron be converted into a persulphate, as directed in the formula for *Ferri Peroxydum Hydratum*, and, by the addition of distilled water, let the solution of the persulphate be augmented to the bulk of eight ounces. Dissolve the valerianate of soda in ten ounces of the water, then mix the two solutions cold, and having placed the precipitate which forms upon a filter, and washed it with the remainder of the water, let it be dried by placing it for some days rolled up in bibulous paper on a porous brick. The preparation should be kept in a well-stopped bottle.

Process.—When valerianate of soda is added to persulphate of iron, both are decomposed, the valerianic acid combining with the sesquioxide of iron to form valerianate of iron, which is scarcely soluble in water, and is precipitated; and sulphate of soda, which remains in solution, and is separated by the filtration and subsequent washings.

Materials.		Results.
3 eqs. valerianate of soda	3 eqs. soda	3 eqs. sulphate of soda.
	3 eqs. valerianic acid	
1 eq. persulphate of iron	3 eqs. sulphuric acid	
	2 eqs. sesquioxide of iron	1 eq. valerianate of iron *t*.

Properties.—Valerianate of iron is not crystalline, but has a dark brown, resinous appearance. It is insoluble in water, either hot or cold, but the odour is perceptible in the steam which rises from it when boiled. It has a strong odour of valerianic acid, which remains in the room for a considerable period after opening a bottle containing it, or manipulating it in any way. It is readily dissolved by boiling spirit, forming a deep brown solution which has much less odour than the watery decoction, and again deposits the iron on cooling.

Adulterations. — Valerianate of iron has been frequently adulterated by the use of butyric and other vegetable acids instead of valerianic acid, and it is difficult to give satisfactory tests against all frauds. If, however, a sample answers to the above characters, it may be relied on so far as our knowledge at present extends.

Medicinal properties. — *Tonic* and *antispasmodic.*

Uses.—It is supposed to combine the properties of valerian and iron, and is given in the cases in which this combination of drugs is employed, viz. flatulent *hysteria*, *chlorosis*, and *chorea*. It has also been used in *epilepsy*. The expectations which were raised as to the good effects to be derived from the valerianates do not appear to have been realised, as they have not obtained a general acceptance, nor have those practitioners who have used them adhered to their employment.

Dose. —As valerianate of iron is insoluble in water, it is chiefly, if not exclusively, prescribed in the form of pills, the dose being from gr. ij to gr. iv, according to the effect produced.

PRÆPARATA EX HYDRARGYRO.

PREPARATIONS OF MERCURY.

HYDRARGYRUM.

MERCURY. QUICKSILVER. *Symb.* Hg. Eq. 202 or 200; 101 or 100.

Remarks. — This is the only metal which is fluid at common temperatures. It is found in small quantities in the metallic state, mixed with its ores, of which the most important and abundant is the bisulphuret, or native cinnabar. The chloride is also found native in small quantities. The chief supply of mercury is from the mines of Almaden, in Spain; Idria, in Carniola; and, recently, from California and China.

Preparation. — The mercury is easily obtained in the metallic state by heating the bisulphuret with quick lime, which combines with the sulphur, and the mercury is sublimed.

Properties. — Mercury is fluid at common temperatures, but freezes at about −40° F., and boils at from 660° to 666° F. It very slowly volatilises, even at common temperatures (*Faraday*).

Its sp. gr. is 13·5, and when freezing it contracts, and becomes 15·5. It is volatile, and so are *all* its compounds, though some of them are decomposed below the temperature requisite for sublimation. When so finely divided as not to be recognised by the ordinary characters, it may be scraped together with the point of a knife, so as to form a minute globule; or it may be known by the white stain formed when it is rubbed upon metallic gold or silver, which stain disappears when heated. Mercury forms compounds with gold, silver, lead, tin, &c., which are termed amalgams, and if the proportion of the other metal is small, they are fluid. Mercury is insoluble in hydrochloric or acetic acid, and in *cold* sulphuric acid; but when boiling, this acid oxidises and dissolves it. It is oxidised and dissolved by nitric acid, either hot or cold. Its equivalent was formerly considered to be 200 or 202 by all British chemists, though many French ones reckoned it only at 100. In this work I shall retain 202 as its equivalent, all the names in the Pharmacopœia being based upon the assumption that this or 200 is its true number; but as most English chemists are now agreed in reckoning it at 100, it is desirable to explain the reasons for the change, and show how it would influence the names of the different preparations if it were adopted.

As a general rule, any substance composed of but two particles will be less easily changed or decomposed than if it consisted of three or more; and, therefore, when chemists find that a chemical compound is little liable to change by keeping, or by being heated or acted upon by various agents, they assume that it consists of a single atom or particle of each substance — that it is, in fact, a proto-compound. For example: — The black oxide of copper is not readily changed by heat or by keeping, and when acted upon by acids it is dissolved, and forms salts from which it may still be recovered as black oxide. They therefore consider that it is a compound of one atom of copper and one atom of oxygen — that it is a protoxide of copper. But the red oxide, which contains only half as much oxygen, readily changes; and when acted upon by acids it is partially converted into the black oxide. They therefore suppose that it consists of more than two atoms, probably of three — viz. two of copper and one of oxygen.

Now, the same principle being applied to the compounds of mercury, chemists now think that the so-called *Bin*-oxide of mercury, 2 of oxygen and 1 of mercury, really consists, not of 3 atoms, but of 2, and is a *protoxide*, 1 of oxygen and 1 of mercury, because they find that it is a substance little liable to change; whilst on the other hand they consider that the so-called protoxide, 1 of oxygen and 1 of mercury, really consists of more than two atoms, because they find it is so liable to change that mere exposure to light alters its characters and composition, and that it is difficult to combine it with acids without change. They therefore consider that it consists of 2 atoms of mercury and 1 of oxygen, instead of 1 of each.

So also they find that corrosive sublimate is less liable to change

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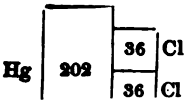

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that it formed only one, and they therefore named this compound *Bi*-chloride of mercury— or 2 of chlorine and 1 of mercury. French chemists, on the contrary, and modern English ones, imagine that it forms two particles, *c* and *d*, each of which weighs, therefore, 101. And now, when these are put along with the chlorine, they find two particles of mercury and two of chlorine, fig. 3; or one of each, instead of one particle of mercury and two of chlorine, fig. 4. It is, however, evident that the actual quantities are the same in both cases, and that we may either say that we have 1 compound particle, fig. 4, of bichloride of mercury; or 2 compound particles, fig. 5, of chloride: and the stability of corrosive sublimate now makes chemists assume that it is a small body composed of only two particles rather than a large one composed of three. Its weight or equivalent will therefore be Hg 101 + Cl 36=137, rather than Hg 202+2 Cl 72=274; and its name will be chloride rather than bichloride. As I have already said, however, I shall adhere to the old theory, rather than adopting the new one, for the sake of avoiding confusion and mistakes.

Characters and tests.—Sp. gr. 13·5. It passes off in vapour by heat. The globules being gently driven over a sheet of paper, not even the smallest portion adheres to the paper.

E. Pure sulphuric acid agitated with it, evaporates, when heated, without leaving any residuum.

If mercury contains any tin, lead, or zinc, which are the most likely impurities, they remain behind when it is heated, and they cause the mercury to run upon paper with a "tail," which adheres to the paper. Both zinc and lead would be so far *soluble* in sulphuric acid as to prevent its leaving *no* residuum when heated. For the characters by which the compounds of mercury are known, see HYDRARGYRI BICHLORIDUM, *Tests*, p. 493. If, however, the salt is a *proto* compound, the effect of alkalies is to throw down a *black*, and not a yellow or *red*, precipitate; and iodide of potassium gives a greenish-yellow instead of the deep red precipitate there mentioned.

Purification of mercury.—It may be purified from *mechanical* impurities by agitating it in a bottle with a little *slightly damp* sugar * which entangles the dirt, and then filtering it through chamois leather, or a small cone of paper so folded as to have a *minute* hole at the apex. From *chemical* impurities, it is best purified by leaving it for about a week in contact with a solution of nitrate of mercury, occasionally agitating it; or by heating it gently with a similar solution; in either case, the acid deposits a certain quantity of the mercury it had previously contained, and in its place dissolves the metal which had rendered the mercury impure. The solution must then be poured off, and the mercury washed and filtered.

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* Faraday's Chem. Manip.

Medicinal properties and uses. — It is much disputed whether fluid mercury possesses any medicinal properties; but from the following statements, it appears that it does exert medicinal powers. It is not often given in a visibly metallic state, though it has been administered in this form, in considerable doses, in *intussusception* of the *bowels*. The hypothesis that it overcomes the obstruction by its fluidity and great weight cannot be entertained; for it has been well remarked that the bowels, in some places, ascend; and though its weight may help it downwards, it cannot assist it to rise again. In some instances, it does pass through the bowels, and is found in the sheets in minute globules. The chief benefit derived from it, in these cases, is, that it shows the existence of a passage through the bowels, however small it may be. There is, however, another case in which it produces undeniable benefit: "it is more effectual in allaying the obstinate vomiting of intestinal obstruction than any other agent I have ever seen used; and by doing this, there is an opportunity for the exhibition of remedial agents, without distress to the patient, and certainly with a greater and more reasonable prospect of success, than when all medicines are invariably expelled from the stomach soon after they are swallowed." * Some cases have been published in which several ounces of fluid mercury have produced salivation and other severe effects, after being retained in the bowels for a length of time; but it is probable that, in these instances, the metal had become oxidised; for it is well established that, in most cases, fluid mercury produces no *injurious* effects; and that, in many, it produces no sensible effects at all. But though, when *fluid*, it exerts little influence over the system, it by no means follows that, when very finely divided, it is equally inoperative. It has long been doubtful whether blue pill and the analogous preparations contained anything but finely divided mercury. Dr. Christison has, however, lately proved that blue ointment contains a small portion of oxide of mercury; and, still more recently, I have shown † that blue pill and hydrargyrum cum cretâ contain protoxide of mercury in small proportions, varying from gr. 0·134 to gr. 0·78 per cent. The effects of these two preparations are, however, so disproportioned to the quantity of oxide present, that something must be attributed to the finely divided metallic mercury, though the question still remains open, whether this becomes oxidised in the stomach and bowels before it produces its effects. *Mercurial vapour* is unquestionably active and injurious; and workmen who are much exposed to it suffer materially in their health, as is seen amongst gilders, looking-glass silverers, barometer makers, and workmen in mercury mines. The affection which it produces is a peculiar kind of palsy, indicated by trembling of the limbs, sometimes by stammering, dizziness, and loss of memory. The first symptom is unsteadiness in the arm. Pereira remarks that the shaking has always ceased during sleep in the cases under his observation, and that he knows no remedy for the disease. Christison considers the vapour to have become oxidised before it produces these effects.

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* Dr. Hobson, Leeds.

† Pharm. Jour. March, 1845.

Medicinal properties of the mercurial compounds generally.— These are exceedingly numerous and various. When taken *internally*, they are *alterative; aperient* or *cathartic; sialogogue; antisyphilitic; antiphlogistic; sedative* or *contra-stimulant; resolvent* or *liquefacient; anthelmintic; diuretic? diaphoretic?* When applied *externally*, or *locally*, they are *corrosive, irritant, errhine*, and capable of exciting the peculiar effects upon the system, denominated mercurial.

Alterative.— This is a very general, and, in some respects, inexplicable term. It is applied to such remedies as improve or alter the secretions and general health without producing any marked excretion or other tangible evidence of the mode in which they operate. Many of the mercurial compounds act as decided excitants upon the biliary organs, causing an increased flow of bile, and probably an increased secretion. They also act upon the skin in some degree, but seldom sufficiently to deserve the term diaphoretic, though they promote the operation of other remedies of this class. Under the general title, alterative, is here meant the influence which they exert upon the system, by which various diseased states, and especially that termed syphilitic, are corrected, and the health is restored without the occurrence of any intermediate ostensible effects.

Cathartic or aperient.— Some of the preparations, as calomel, act as efficient cathartics, whilst others, as hydrargyrum cum cretâ, are only mild aperients. The effect is, in some degree, proportioned to the dose, though no dose of the latter, which is ever given, would produce so decided effects as a moderate dose of the former. Their purgative influence is generally accompanied by an increased discharge of bile, and also by the removal of the morbid tenacious mucus which accumulates in the small intestines in some diseases, especially those of tropical climates, and which Annesley thinks to be removed by the chemical influence of the calomel.* He mentions experiments to show that the tenacious mucus, which he believes to obstruct the orifice of the ductus communis choledocus, becomes liquefied and removed when in contact with that medicine, and the accumulated bile is thereby liberated, and escapes into the intestines. The purgative tendency is sometimes an objection, and requires checking by the addition of chalk or opium, when the object is to produce the "mercurial effect" upon the system.

Sialogogue.— This is often the first evidence of the constitutional effects of mercury, and, in many cases, the remedy is continued, until some degree of salivation is produced, in order to prove that, the system, generally, is under its influence. The opinion formerly prevailed, that the benefits to be expected depended upon the amount of salivation, and patients were kept for days or weeks in this state, voiding some pints of saliva daily. But it is now generally believed, that the salivation is, in itself, an evil, and that the only advantage derived from it is, the evidence thereby afforded of the influence exerted by the medicine. The object therefore, in the present day, is to moderate, rather than to excite this secretion.

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* Diseases of India, &c. 8vo. 1831, chap. v.

The length of time and the quantity of mercury requisite to produce salivation vary exceedingly in different individuals. In some cases, many grains of calomel may be given daily for weeks, without producing this effect, whilst in others, one or two grains will excite profuse salivation. This extreme susceptibility, though far from common, is not very rare; but it can never be anticipated before trial in any particular instance. Children are not so readily salivated as adults; indeed, salivation is rarely produced. It was formerly the custom to take away blood, and to enjoin a strict antiphlogistic regimen during the administration of a course of mercury, by which it was thought that the effect was hastened and rendered more certain; and though this is now seldom attended to, it is highly probable that, were modern practitioners more attentive to these accessories, some of the cases of failure would be found to yield and produce the desired result. When the object is to affect the system generally, the mercurial preparation is given in repeated small doses, combined with some astringent or opiate, to prevent it from running off by the bowels. Thus, one or two grains of calomel, combined with chalk, and given three or four times daily, will generally excite speedy salivation, whilst if given in a single dose once in the day, it would act decidedly upon the bowels, and not affect the system in the same way.

Symptoms of mercurialism.— Of these the most decided is the profuse flow of saliva, which is poured out in such quantity that it runs involuntarily from the mouth, and the patient is quite incapable of preventing its discharge. The *first* symptom is generally a red line in the gums at the line of junction with the teeth; they are tender, and, if roughly pressed, sometimes bleed. About the same time, the breath acquires a peculiar and very offensive fœtor, characterised as *mercurial*, and the patient has a disagreeable metallic taste, often described as resembling that of a halfpenny in the mouth. As the case advances, the gums and inside of the cheeks and lips, and the tongue, become much swollen and ulcerated; the latter being sometimes so large, as to be constantly protruded from the mouth; the flow of saliva is incessant; the salivary glands are enlarged and painful, and hence the neck is swollen and tender; and the teeth ache and become loose, though it is exceedingly rare for them to drop out. It occasionally happens that, after mercury has been exhibited for some time, even without producing salivation, the pulse becomes unusually quick, and continues so for some time after the discontinuance of the medicine. It is necessary to bear this in mind, lest the mercury should be continued too long, under the idea of some inflammatory action still proceeding and requiring the medicine for its suppression.

Salivation produced by other causes. — Salivation sometimes occurs spontaneously in the course of a catarrh, and is sometimes produced without any evident cause. A case was in Guy's Hospital about 1843, in which every symptom so closely resembled those of mercurial salivation, that it was only from observing the obstinate duration of the affection, that the patient's assertion was believed, that he had not taken any mercury. Several medicines which do not generally act in this way occasionally induce salivation. Of these, the most common are iodide of potassium, iodine, chlorine, and bromine, spirit of nitric ether, prussic acid, hyoscyamus, belladonna, digitalis, trisnitrate of bismuth, and arsenious acid. Tartar-emetic, and some of the compounds of lead and copper, cantharides, and sulphur, opium, nux vomica, and even ipecacuanha, in the form of Dover's powder, have produced it; and it is quite possible that other substances may sometimes act in the same way. See also p. 486.

Treatment of profuse salivation.—The first part must be to suspend the administration of the mercury. The patient should be warmly clothed, and take exercise where he may be exposed to a current of dry air, without being chilled. The diet should be light and nourishing; but solid food can seldom be taken. A brisk saline purgative is occasionally of use, and Christison has found benefit from the employment of nauseating doses of tartar-emetic, or of ten-grain doses of acetate of lead, three times daily, as recommended by Daniell. As local applications, gargles of alum, catechu, or borax and honey, brandy and salt, or other stimulant astringents are in general use. Christison has seen the most benefit obtained by a lotion of one part of chloride of lime in one hundred parts of water. I have seen great relief speedily follow the light application of strong hydrochloric acid, by means of a sponge brushed quickly over the gums and inside of the cheeks, as recommended by Mr. Busk. The application scarcely gives pain.

Detection of mercury in the saliva.—Whilst some chemists have detected a minute portion in the saliva of salivated patients, most have failed to discover any. The quantity must, therefore, be exceedingly small.

Antisyphilitic.—It is remarkable that after possessing the almost unlimited confidence of surgeons for some hundred years in the treatment of the various forms of this disease, the powers and value of mercury should have been so far called in question during the last few years, as to have weakened the confidence of some, and destroyed that of others. The conclusions, however, which may be drawn from the facts disclosed during the controversy on this subject are the following:

1st. That every form of venereal disease *has been* and may be cured *without* the administration of any mercury.

2nd. That in some forms of syphilis, mercury is not only useless, but injurious, when given so as to affect the constitution.

3rd. That in those cases in which it is admissible, the good effects to be derived from it, may be obtained from much smaller quantities than were formerly given.

4th. That some of the symptoms and effects formerly attributed to this disease were due to the mercury itself.

5th. That notwithstanding all the forms of syphilis may be cured without it, yet its judicious administration *materially hastens the cure* in many forms of the disease.

6th. That the occurrence of secondary symptoms is much less liable to happen after the administration of this remedy, than if the disease has been cured without it.

7th. That the liability to secondary symptoms is, in a great degree, dependent upon the length of time which the syphilitic virus has had for being absorbed into the system; and that, therefore, it becomes a point of primary importance *to heal a venereal sore as quickly as possible;* and as this can generally be sooner effected with mercury than without it, its employment on this ground is most advisable (*Tuckett*).

8th. That in those venereal sores characterised by slowness of progress, and the deposition of albumen or lymph (commonly called "hard chancres"), the use of this remedy is almost essential: whilst in those characterised by rapidity of progress, and the absence of any barrier by the effusion of lymph, or those in which there is a tendency to rapid ulceration, it is, on the contrary, less beneficial, if not positively injurious.

9th. That in the venereal eruptions of a papular or scaly form it is beneficial, whilst in those of an ulcerative character, as ecthyma or rupia, it is hurtful.

10th. That its administration ought generally to be suspended when suppuration is taking place in a large bubo.

11th. That the benefit derived from its use is not proportional to the amount of salivation induced; and that, except as an evidence of a constitutional effect, this result is undesirable.

12th. That in constitutional syphilis in one or both parents, shown by frequent abortions, or by the birth of children affected with syphilitic eruptions, it is imperatively necessary that mercury should be given to both parents.

13th. That mercury in its milder forms is almost, if not quite indispensable, in the treatment of hereditary infantile syphilis.

Antiphlogistic. — When mercury acts as a purgative it often causes considerable temporary depression, and some of its preparations occasion distressing nausea, but not vomiting. In acute inflammations it generally reduces the pulse, abates the pain and fever, and produces a favourable termination of the case. These effects are much promoted by the previous abstraction of blood; and are seldom noticed until some degree of salivation or tenderness of the gums is induced, showing that the system generally is under its influence; and its operation is often attended with a degree of perspiration.

Sedative or contra-stimulant. — This term may be thought to be similar to the last; but the meaning here attached to it is essentially different. The effect here alluded to has been noticed in the *operation of calomel only* upon *diseased* alimentary mucous membrane, and has been chiefly observed by practitioners in the East, who find that in dysentery, large doses of calomel (℈j, several times daily) allay the pain, tenesmus, and general irritation, instead of exciting or increasing them as is *usually* the case in the diseases of this country, and as is *always* the case if the mucous membrane is not previously in an unhealthy state.

Resolvent or liquefacient. — This is a most valuable property of the mercurial preparations, in which they stand almost alone. Under their continued use, various new or recent formations gradually disappear, and this even if they have become organised, and some inorganic deposits, as well as old and natural structures, are also removed under their influence. As an example of the first of these may be mentioned, the absorption of the lymph deposited upon the iris, in iritis, which may be seen to disappear from day to day, as the employment of the remedy is continued. The absorption of the fluid contents of some buboes and other enlarged glands, and of the effusion into the pleura and pericardium in inflammation of these tissues, is evidence of the second statement; whilst the absorption of the alveolar processes, and of the cranial and other bones, formerly attributed to the action of the venereal virus, but undoubtedly capable of being occasioned by mercury, furnishes examples of the last.

Under the continued use of mercury, the quantity of albumen in the blood diminishes, and the proportion of serum increases. Albumen and fibrine are, chemically, almost identical, and it is not therefore surprising that the further deposition of fibrine in inflammations should be checked by the administration of mercury; and that the fibrine recently deposited should be reabsorbed more or less completely.

Anthelmintic. — Calomel is frequently employed to expel ascarides, but it is doubtful whether it acts otherwise than as a simple purgative. It is not the less valuable on that account.

Diuretic. — Mercury can scarcely be called a diuretic when administered alone, but it promotes the action of many remedies of this class. Hence it is common to combine blue pill with squills or digitalis; and, in some cases, the good effects are not perceived until the system is brought under its influence.

Diaphoretic. — Mercury would never be administered alone as a diaphoretic, but some of its compounds, when combined with other remedies, produce some degree of perspiration. The bichloride acts more decidedly in this way than any of the other preparations of this metal.

Effects of external application: —

Corrosive. — When bichloride or nitrate of mercury comes in contact with a mucous membrane, or with any tissue undefended by cuticle, it acts like a caustic, and destroys the tissue, producing a slough, and subsequently an ulcer, as is strikingly shown in cases of poisoning by corrosive sublimate. When the binoxide is sprinkled upon an ulcer, it excites acute pain, and destroys the granulations; whilst, if more moderately applied, it acts only as a healthy stimulant.

Irritant. — This is seen when almost any compound of mercury is brought in contact with a mucous membrane or an open sore.

Errhine. — This is dependent upon the last-named property. The subsulphate of mercury was formerly used as an errhine, but is not now employed, and is not contained in the Pharmacopœia.

Production of the peculiar constitutional influence of mercury. — All the constitutional effects of this substance may be obtained by the external application of some of its compounds, and, in some cases, this is the best way of introducing it. (See UNGUENTUM HYDRARGYRI.)

Bad consequences sometimes caused by mercury: —

Profuse salivation (see *Medicinal Properties of Mercury*, sect. *Sialogogue*, p. 483.); *profuse diarrhœa; mercurial erethism; violent sweating; eczema mercuriale; mercurial iritis and periostitis with nodes.* It is very doubtful whether some of these are not caused by other agents than the mercury, as they only occur when this mineral has been given for the cure of some form of syphilis. Severe *ulceration and sloughing*, *mercurial palsy*, and *general cachexia* are undoubtedly sometimes caused by mercurials. A tendency to *hæmorrhage* is said to be induced by mercury, especially amongst old people. "Almost all the aged people treated with mercury for syphilis have, according to my observation, died shortly afterwards of hæmoptysis or apoplexy; and I have seen several instances of young persons, under similar circumstances, being seized with hæmoptysis, or dying rapidly of consumption." (Dr. Porter, Rank. Abs. vol. v. p. 66.)

In the Br. and For. Med. Chir. Rev. Jan. 1853, a number of cases are recorded of salivation occurring long after the discontinuance of mercury, and these have been attributed to the mercury which is assumed to have been lying in a latent, inactive state in the system, having been rendered soluble, or, at any rate, active, by the subsequent administration of iodide of potassium. I have, however, seen profuse salivation occasioned by this latter medicine when no mercury had been previously given; and, without venturing to dogmatize upon the subject, I do not think that the occurrence of salivation on the administration of iodine, months after mercury has been used, can be fairly attributed to the mercury without further proof than we possess at present. The subject, however, deserves notice, and a further accumulation of facts may render our knowledge upon this point more satisfactory than it now is.

Symptoms of mercurial erethism. — Gradually increasing pale-ness; inquietude, and frequent sighing; respiration more frequent, with, sometimes, oppression in the chest and anxiety about the præcordia; irregular action of the heart; weak, frequent, and irregular pulse; sometimes vomiting, though the tongue is seldom furred. When these symptoms are present, any sudden or violent exertion sometimes occasions sudden death. The medicine ought, with these symptoms, to be immediately suspended.

Absorption of mercury. — Though many of its compounds are insoluble, there is sufficient evidence to prove that it is absorbed into the system. Christison has collected the following from various sources:

1st. Mercury has been detected in the blood by several chemists, though it requires destructive distillation to make its presence recognised by the usual tests.

2nd. It has been found after death in the bones, brain, synovial tissues, humours of the eye, and lungs.

3rd. After the use of sulphur, a course of mercury has caused blackness of the skin, from the formation there of sulphuret of the metal. It has also been found in the perspiration, saliva, bile, and urine.

Dr. Inman has found it in the urine six or eight weeks after the administration of mercury has been discontinued.

Uses. — The diseases in which mercurial preparations are generally used are the following: —

Acute inflammations of *serous* membranes are *more benefited* by it *than* those of *mucous membranes*, in which it is generally injurious rather than useful. Thus, in *pleurisy*, *peritonitis*, *arachnitis*, *pericarditis*, it produces good results; whilst in *enteritis* and *bronchitis* it is less beneficial, though even in these its moderate employment is not to be disregarded. In *croup*, which is an affection of a mucous membrane, it is given very largely and at short intervals, as the progress of the disease is so rapid that all treatment must be prompt which is to do any good. In *acute dysentery* of eastern countries, calomel is given in very large doses, and with decided benefit. (See *Sedative Effects of Mercury*, p. 485.)

In *chronic hydrocephalus*, it can only do harm, if given so as to affect the constitution; but small doses (gr. j) of chloride of mercury, combined with an alkali, as bicarbonate of soda, and administered every night or every other night, in conjunction with liquor potassæ during the day, produce good effects in this intractable disease. It is often given in *chronic pericarditis*, in order to reduce the effusion, but it is not to be trusted to alone in this affection; and *though* very serviceable in the *first* stage of *pleurisy*, yet it does little good in the chronic stage of hydrothorax. *Synovitis* and *conjunctivitis*, which hold an intermediate place, are less benefited than the affections of purely serous membranes; but the importance of active treatment in the latter sometimes leads to its employment, when otherwise it would be better omitted. It is not often given alone for the cure of *sclerotitis;* but if conjoined with opium, Dover's powder, or colchicum, it is frequently of use, in moderate doses, as one or two grains, twice a day; and the occurrence of salivation is not injurious to the patient. In *strumous corneitis* and in *strumous conjunctivitis*, the most striking symptom in which is sometimes the excessive intolerance of light, the administration of one grain of calomel every night combined with poppy fomentations, produces a most beneficial effect. In severe cases, in which the eyes have not been opened for days, I have repeatedly seen the intolerance of light disappear in three or four days, and the eyes quickly resume their natural healthy character; whilst they have daily become worse under the employment of astringents and tonics without the mercurial. If carried to the extent of producing salivation, it does harm; but in the above moderate amount its effects are most beneficial. Inflammation of parenchymatous structures, as *pneumonia* and acute inflammation of the *liver*, requires its early and active administration; as do also acute *testitis* and *chronic enlargement* of the testicle, dependent upon venereal causes. In *syphilitic iritis* or *iritis dependent upon an injury*, it must be given rapidly, so as to produce an effect as quickly as possible; and its employment should be continued until the whole of the deposited lymph has been reabsorbed. In *gouty* or *arthritic* iritis it is generally prejudicial.

Fever.—In continued fever, the employment of mercury is not only often admissible, but is of much service. It improves the secretions, and it is found that when the system can be got under its influence, the patient generally recovers. Even in those cases in which there is some gastro-intestinal irritation, it is not entirely to be avoided: for the removal, by its means, of the irritating contents of the bowels produces more relief than itself does harm, and the irritation which it produces in fever is not always so great as that which it excites during health. Some physicians prefer introducing it by means of inunction, a portion of mercurial ointment being placed in the axilla, where it is gradually absorbed.

Dropsies.—In acute *ascites* dependent upon cold or inflammation, it will be beneficial; but, when dependent upon organic disease of the liver, it cannot do any good. In most cases it aids the operation of diuretics, and is therefore given; but it is *almost always prejudicial* in *dropsy accompanied* with *the secretion* of *albuminous urine.* In *chronic synovitis* it is often of use, both given internally, and applied externally in the form of ceratum hydrargyri compositum. In *dropsy of the anterior chamber of the eye* it is useful; but it seldom does any good in hydrocele. In *hydrothorax*, *hydrocephalus*, and *hydropericarditis* it sometimes does good, but the benefit derived from it is generally small in proportion to the length of time the disease has existed.

Syphilis.—The *forms* of this disease most *benefited* by it are the *indurated chancre*, and *papular* and *scaly* secondary *eruptions.* It should be given until the whole of the induration has disappeared. It is useful in nearly every form of venereal sore; but if the ulcer is treated immediately upon its appearance with caustic, and is healed at once, its administration is not generally necessary, though it ought to be given whenever any hardness is present. It is *decidedly prejudicial* in *phagedenic ulceration;* and, in *ecthyma and rupia*, its *internal* administration is *hurtful*, though the sores may be beneficially dressed with the unguentum hydrargyri nitrico-oxydi. There is scarcely any form of venereal sore, which may not be treated with black wash externally. *Indurated buboes* sometimes disappear under the use of mercury; but it is injurious when they have begun to suppurate. *Gonorrhœa* is not generally benefited by it; but a gleet may be dependent upon a syphilitic sore in the urethra, and is sometimes cured by the administration of mercury, when all other means have failed.

Nodes, *both solid* and *fluid*, and *exostosis* dependent upon periostitis, are often removed by a course of mercury.

Cases in which mercury is objectionable.—*Scrofulous* patients generally suffer from any of its forms, except the iodide and biniodide; but as its employment may be necessary, it should be remembered that it must be used with caution; that a smaller quantity will suffice than in other cases; and that its administration should be discontinued as soon as possible.

Albuminaria, or dropsy with the secretion of albuminous urine, is *almost always* made *worse* by its employment.

Doses.—For the doses, see the particular preparations.

Administration.—See the particular preparations.

Officinal preparations.—Hydrarg. cum Cret. *L. D. E.*; cum Magnes. *D.* Hydrarg. Chlor. *L.D.E.* Hydrarg. Bichlor. *L.D.E.* Hydrarg. Am.-chlor. *L. D. E.* Hydrarg. Nitrico-oxyd. *L. D. E.* Hydrarg. Iodid. *L. D. E.* Hydrarg. Biniodid. *D. E.* Hydrarg. Bisulphuret. *L. D. E.* Liq. Hydrarg. Pernitratis, *D.* Hydrarg. Sulphas, *D.* Liq. Hydrarg. et Arsen. Hydriodatis, *D.*

HYDRARGYRUM CUM CRETA, *L. D. E.*

MERCURY WITH CHALK.

Take of Mercury, three ounces (℥j, *D.*).
Prepared chalk, five ounces (℥ij, *D.*).

Rub them together until globules are no longer visible.

Process.—By long-continued trituration the mercury is very minutely divided, and mixed with the chalk; so that, when well made, this powder has a bluish-grey, or slate colour, and no globules of mercury are visible to the naked eye. To effect this requires many hours' diligent trituration, and the process is always now conducted by means of steam power.

Composition.—The greater part of the mercury is simply finely divided, but a small portion is oxidised. In some specimens which I have carefully analysed, the quantity of oxide amounted to gr. 0·406, or less than half a grain per cent. Many pharmaceutical writers doubt the existence of any oxide in this preparation, which is probably owing to their never having examined any with care.[*]

Character and tests.—Part passes off in vapour by heat; what remains, answers to the characters before given for prepared chalk.

It is not liable to adulteration, but it may be carelessly made, and the mercury not finely divided.

Powders for which it may be mistaken.—Hydrarg. cum magnes.

Medicinal properties.—It is the mildest of all the mercurial preparations, and is peculiarly adapted for children, and those cases in which it is desirable to produce very gentle effects. All the constitutional effects of mercury may, however, be obtained by its use, if long continued. It is remarkable that some writers have described this preparation as being destitute of medicinal properties, and have suggested its removal from the Pharmacopœia. I have known it cause salivation more than once or twice.

Dose.—Gr. ij to gr. x. For children, to whom it is chiefly given, gr. iv to gr. vii is an average dose. The Dublin preparation is very slightly weaker than that of London or Edinburgh, but not sufficiently so to affect the dose.

HYDRARGYRUM CUM MAGNESIA, *D.*

MERCURY WITH MAGNESIA.

Take of Mercury, one ounce.
Carbonate of magnesia, two ounces.
Rub them together as in Hydr. cum Creta.

Remarks.—This preparation corresponds in effects and dose with the hydr. cum creta; but as the magnesia is much lighter than chalk, it has the disadvantage of forming a far more bulky dose.

Powder for which it may be mistaken.—Hydr. cum creta.

Dose and properties.—Same as those of hydr. cum creta above.

HYDRARGYRI BICHLORIDUM, *L.D.E.*

BICHLORIDE OF MERCURY.

Synonyme. Sublimatum Corrosivum, *D.* Sublimatus Corrosivus, *E.* Hydrargyri Murias Corrosivum, *D.* Mercurius Corrosivus Sublimatus, *Ph. L.* 1746. Hydrargyri Oxymurias. Corrosive Sublimate.

Take of Mercury, two pounds.
Sulphuric acid, twenty-one fluid ounces and a half.
Chloride of sodium, a pound and a half.

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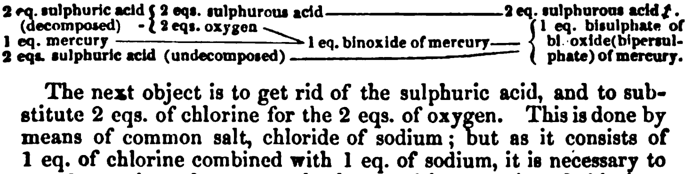
[*] Pharm. Jour. March, 1845.

Boil down the mercury with the acid until the bipersulphate of mercury remains dry; rub this, when it is cold, with the chloride of sodium in an earthen mortar; then sublime with a heat gradually raised.

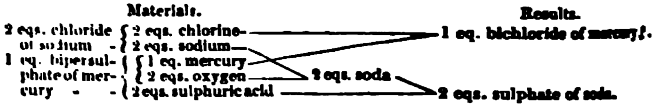
D. Take of (per) sulphate of mercury, ℔ x; Dried chloride of sodium, ℔ v. Mix them thoroughly and sublime.

E. Take of mercury, ℥iv; Sulphuric acid (com.), f℥ij and f℥iij; Pure nitric acid, f℥ss; Muriate of soda, ℥iij. Mix the acids; add the mercury; dissolve it with the aid of a moderate heat; and then raise the heat so as to obtain a dry salt. Triturate this thoroughly with the muriate of soda, and sublime in a proper apparatus.

Process.—Cold sulphuric acid does not act upon mercury, but when they are considerably heated together it is partially decomposed, and the mercury is oxidised at the expense of one portion of acid, and the oxide is afterwards dissolved by the remaining undecomposed acid. The exact changes which take place are as follows: The materials are taken in the proportion of 1 eq. of mercury to 4 eqs. of sulphuric acid. This acid, as has been already mentioned, consists of 1 eq. of sulphur, S, and 3 eqs. of oxygen O^3, or it may be represented as composed of 1 eq. of sulphurous acid, SO^2, and 1 eq. of oxygen, O. When it is heated in contact with mercury, 2 eqs. of acid are decomposed, and each gives 1 eq. of oxygen to the 1 eq. of mercury, which thus becomes binoxide or peroxide of mercury, HgO^2. At the same time, the 2 eqs. of sulphur*ous* acid, from the decomposed sulphur*ic* acid, fly off in the form of gas. The two remaining eqs. of undecomposed acid combine with the binoxide of mercury and form bisulphate of binoxide of mercury, which, for the sake of shortness, is generally called *bi-per-sulphate* of mercury; the *bi*, referring to the number of equivalents of acid; the *per*, to the number of equivalents of oxygen combined with the mercury. When the boiling is continued until the salt is dry, the result is this bipersulphate of mercury.


Materials.
Results.
2 eq. sulphuric acid (decomposed)
2 eqs. sulphurous acid
2 eqs. oxygen
1 eq. mercury
2 eqs. sulphuric acid (undecomposed)
1 eq. binoxide of mercury
2 eq. sulphurous acid ƒ.
1 eq. bisulphate of bi oxide (bipersulphate) of mercury.

The next object is to get rid of the sulphuric acid, and to substitute 2 eqs. of chlorine for the 2 eqs. of oxygen. This is done by means of common salt, chloride of sodium; but as it consists of 1 eq. of chlorine combined with 1 eq. of sodium, it is necessary to use 2 eqs. in order to supply the requisite quantity of chlorine; 2 eqs. are therefore taken, and mixed with the 1 eq. of bipersulphate, and heat is applied; both are decomposed; the 2 eqs. of chloride of sodium give up their 2 eqs. of chlorine, which combine with the mercury and form bichloride of mercury; the 2 eqs. of oxygen are thus set free, and combine with the 2 eqs. of sodium to form 2 eqs. of soda; and the 2 eqs. of sulphuric acid combine with them and form 2 eqs. of sulphate of soda. By the heat which is employed the bichloride of mercury is sublimed, whilst the sulphate of soda remains in the crucible.



The Dublin process begins with taking the bipersulphate, ready made, which is called, in the Ph. D., sulphate, or persulphate, and requires no special explanation. In the Edinburgh process a portion of nitric acid is used, which, instead of the sulphuric acid, gives oxygen to the mercury. This acid then combines with the binoxide of mercury formed by the nitric acid, and forms bipersulphate as before; after which, the process is the same as that already described, the only difference being that the common salt is called muriate of soda, instead of chloride of sodium.

Properties.—Bichloride of mercury is generally seen in masses having a crystalline appearance, but in which no distinct form can be recognised. When obtained in crystals, their *primary* form is a *right rhombic prism* (*Phillips*). It is colourless and semi-transparent, and has an acrid, burning, and horribly nauseous taste. It dissolves in twenty parts of cold, or two parts of boiling water, and it is remarkable that cold ether also readily dissolves it, by means of which it may be removed from its solution in water, or in organic fluids. This property is made use of for obtaining it in a state suitable for the application of tests, when it has been taken or administered as a poison. It is also soluble in two parts of alcohol, and in concentrated hydrochloric acid.

It is decomposed by the alkalies, and forms double salts with the chlorides of potassium and sodium, and with hydrochlorate of ammonia. The latter salt possesses the property of rendering the bichloride more soluble in water than it is when dissolved by itself. It is volatile; its sp. gr. is 5·2. The aqueous solution is gradually decomposed by light, calomel being deposited (*Turner*). It is decomposed, and forms precipitates with infusions of chamomile, calumba, catechu, cinchona, rhubarb, senna, oak bark, and tea (*Thompson*). It also coagulates albumen, and is at the same time decomposed, from which property, this fluid is employed as the best antidote in cases of poisoning by corrosive sublimate.

Composition.—Bichloride of mercury consists of

1 eq. mercury, 202; 2 eqs. chlorine, 36×2, 72 = $HgCl^2$; eq. 274.

or, according to the modern equivalents of mercury,

1 eq. mercury, 101; 1 eq. chlorine, 36 = $HgCl$, eq. 137.

Characters and tests.—Crystalline; it melts by heat, and afterwards sublimes. It is dissolved by water, by rectified spirit, and by ether; what is thrown down from the water on the addition of potash, soda, or lime-water, is red, or, if abundantly added, yellow; the precipitate, on the application of heat, emits oxygen, and passes into globules of mercury.

It is not liable to be fraudulently adulterated, and the entire solubility in ether proves the absence of chloride of mercury (calomel) from imperfection in the manufacture.

Salts for which it may be mistaken.—It can scarcely be mistaken, when solid, for any other substance, as its great weight distinguishes it from all common salts. The following tests are perfectly conclusive.

Tests.—Corrosive sublimate is so important, from the frequency with which it is employed as a poison, that its tests will be given in this place at considerable length. If the poison is in a *solid* form, it ought, 1st, to be totally volatilised from platinum by heat. 2nd. If heated in a fine test tube with some dried carbonate of soda, it is decomposed, and the mercury is sublimed in the metallic state, forming a dark ring on the interior of the tube. If this is examined with the naked eye, or by the aid of a magnifying glass, it is seen to consist of minute globules. If the quantity is too small to produce this appearance, it may be rendered evident by scraping the ring together with the point of a knife, when the apparent powder will be seen to coalesce, and form a distinct globule. 3rd. If rubbed upon the surface of bright copper, moistened with a few drops of hydrochloric acid diluted with twice its weight of water, it forms a whitish stain, which is entirely removed by the application of heat. 4th. It is entirely soluble in water or in ether, and the solution yields the following results:

Tests for a *solution* of corrosive sublimate.

1st. Hydrosulphuric acid or hydrosulphate of ammonia produces a *brown* or *black* precipitate of bisulphuret of mercury; but the effect of this test deserves special notice. When first added the precipitate is frequently *white* instead of black; but if an additional quantity of the test, whether in the gaseous or the liquid form, is added, so that it is in excess, the precipitate rapidly becomes black. This reaction, I believe, is peculiar to bichloride of mercury, and is valuable as distinguishing it from other metals, with which sulphuretted hydrogen produces a black precipitate. 2 eqs. of hydrogen, from 2 eqs. of the acid, combine with the 2 eqs. of chlorine in the bichloride, and the 2 eqs. of sulphur combine with the mercury.

2nd. *Solution of potash*, or *lime-water*, produces a *yellow* or *red* precipitate of binoxide of mercury. 2 eqs. of oxygen from 2 eqs. of the alkali unite with the mercury to form binoxide; and the 2 eqs. of chlorine set free, unite with the 2 eqs. of potassium or calcium, and form 2 eqs. of chloride of potassium or calcium.

3rd. *Solution* of *iodide of potassium* produces a beautiful red precipitate of biniodide of mercury. 2 eqs. of iodine from 2 eqs. of iodide, unite with the mercury, and form biniodide of mercury, whilst the 2 eqs. of chlorine unite with the 2 eqs. of potassium to form 2 eqs. of chloride of potassium. If the test is added in excess it redissolves the precipitate, and forms a colourless solution.

4th. *Protochloride* of *tin* produces, first, a *white* precipitate of protochloride of mercury, or calomel, by the removal of 1 eq. of chlorine: and afterwards, a *black* precipitate of metallic mercury, in the form of an extremely minute powder, by the removal of the second eq. of chlorine. When this precipitate is washed and gently dried, it may either be sublimed in a test tube, or it may be rubbed into a globule by the point of a knife.

5th. A *solution* of *albumen* is coagulated by it. This is not by any means a delicate test, and the nature of the coagulum is not certainly known. Orfila's opinion is generally adopted, that it is a compound of albumen and calomel, the bichloride having been reduced to this state by the loss of 1 eq. of chlorine. Pereira thinks that it is an albuminate of mercury.

It is said that albumen, if added in excess, re-dissolves the precipitate; but if this happens at all, so large an excess is required, that there is no practical objection on this ground to its employment as an antidote. I have never succeeded in redissolving it by any excess of albumen.

6th. *Galvanic test.* This is most *readily* applied by placing a drop of the suspected solution upon a gold or copper coin, and touching the metal and solution at the same time with a common key, or the point of a knife. Wherever this is done, a white or grey spot will be produced, which is entirely removed on the application of heat. Though the white spot disappears on the application of heat, its situation continues strongly marked by a difference of colour, which does not disappear when the coin cools. The remaining colour is, however, so different from that of the amalgam, that the slightest observation will readily distinguish them. The most *delicate* form of this test is proposed by Dr Taylor (*Med. Juris*). He takes a slip of gold 1 inch long, and $\frac{1}{8}$ of an inch broad, and twists spirally round it some zinc foil, and then introduces it into the suspected solution, slightly acidulated with muriatic acid, and leaves it for a few hours. It is afterwards taken out, carefully dried without touching anything, and placed in a small test tube. On applying heat, a ring of metallic mercury is obtained.

The first form of this test exceeds all others in convenience and readiness of application; it may be tried at any moment, and without exciting suspicion in a case of suspected poisoning; and though its failure, as tried in this rough way, would not absolutely prove the absence of the poison, its success would be highly important in directing future proceedings.

Objections. — The only test which is liable to any objection is the first. Hydrosulphuric acid produces dark or black precipitates with many other metals; but none of these are affected by the other tests as the bichloride is, and no chemist would think of relying upon that alone. If all those which have been mentioned produce the effect described, there is not the smallest doubt of the substance tested having been a bisalt of mercury, and the bichloride is the only one which is soluble in ether. To prove the presence of chlorine in the bichloride, a few drops of a *solution* of *nitrate of silver* will produce a curdy white precipitate of chloride of silver, which is insoluble in nitric acid, but is dissolved by liquor ammoniæ.

Medicinal effects. — The effects are very different in *large* and in *small* doses. In *large* doses it is a most *deadly poison*; in *small* ones it is a valuable *alterative*.

Effects as a poison. — Owing to its ready solubility, bichloride of mercury occasions a horrible taste whilst it is being swallowed, and causes instantaneous burning pain in the mouth, throat, and stomach, and, generally, speedy vomiting of strings of ropy mucus, mixed with food or blood. There is soon profuse, and generally bloody diarrhœa: the countenance is sometimes flushed and swollen, sometimes pale and anxious; and the general constitutional symptoms are those of depression, viz. a small weak pulse, at times scarcely perceptible, and a cold, clammy skin. There is, generally, suppression of urine, which has continued complete for four days between taking the poison and death.

If the patient lives for twenty-four or thirty-six hours, the mouth, lips, and tongue become enormously swollen and ulcerated, and there is generally profuse salivation and bloody diarrhœa, with great tenesmus.

Pathological effects.—These are chiefly observed in the mouth and stomach,—the parts affected when the poison is first swallowed,—and in the cæcum, colon, and rectum,—the parts in which the poison is the longest retained after it has passed through the stomach. The contents of the bowels pass so quickly through the small intestines that the poison has not time to produce its peculiar effects upon them. The mucous membrane of the mouth and throat is softened, and of a white or bluish colour; that of the stomach is inflamed, and has, sometimes, large submucous patches of black extravasated blood. It is generally very much softened, but perforation of the stomach is exceedingly rare, though it is often torn in attempting to raise it. The small intestines are occasionally, though seldom, inflamed, but the colon and rectum are generally much inflamed, and deeply ulcerated. The bladder is frequently corrugated, and its mucous membrane inflamed.

Antidotes. Albumen,—the *whites* of *half a dozen* or a *dozen eggs* should be given as soon as possible. The albumen contained in them is coagulated by the bichloride, and the patient generally has speedy vomiting, by which means the whole poison may be evacuated from the stomach. Its operation is, however, so rapid and fatal, that death has ensued, even when this antidote was administered within a quarter of an hour after the poison was swallowed. An objection has lately been raised to this antidote, viz. that if given in excess the albumen redissolves the coagulum

I have in vain attempted to redissolve, by the white of one egg, the precipitate formed by a single grain of corrosive sublimate. Twenty eggs might, therefore, be safely administered, if only a scruple of the poison had been swallowed, and a much larger quantity than this will generally be taken, whether intentionally as a poison, or accidentally by mistake. In the absence of eggs, *milk* should be freely given; and *wheat flour* made into a thin paste should be tried, if neither of these can be obtained; *iron filings* and *gold dust* have been proposed, in order to decompose the bichloride by galvanic action, but as one of the strongest writers in its favour acknowledges that the metals must be in the state of almost impalpable powder, and even in the laboratory can scarcely be made to answer, they are never likely to come into general use.

Subsequent treatment of poisoning by bichloride of mercury.— Opium, to allay pain and purging; leeches and antiphlogistic treatment, to moderate the gastro-enteritis which will follow in a few hours.

Medicinal effects of small doses. — In very small doses corrosive sublimate frequently improves the health, and removes syphilitic affections of various kinds, without producing any marked influence upon the secretions or excretions, and is therefore termed *alterative*. In other cases, or when given in larger doses, it causes diaphoresis, and sometimes tenderness in the stomach, purging, and vomiting: occasionally, but very rarely, it induces salivation. It *ought either not to be given at all*, or else very cautiously, to persons affected with a *short dry cough*, or liable to pulmonary disorders, as it sometimes produces cough, pain in the chest, and bloody expectoration.

Uses. — *Internally.* Bichloride of mercury is now scarcely ever used for the cure of *primary syphilis*; but it is often employed in *secondary venereal* affections, especially *ulcers* in the *throat*, *scaly* cutaneous *eruptions*, and *nocturnal pains*. It is generally *prejudicial* in *vesicular* or *pustular* eruptions, or those *tending* to *ulceration*; and is *always* to be *avoided* in *phagedenic ulcers*, whether primary or secondary. It is also often used with benefit in *chronic rheumatism* and *chronic periostitis*, and in lepra, not of a syphilitic character. In unhealthy ulcers arising from sloughing subcutaneous cellular tissue, it is also frequently of use. It has been used with benefit in doses of gr. $\frac{1}{16}$ three times a day in *paraplegia* resulting from cold. I believe that Sir B. Brodie and Dr. Latham are the authorities for this statement, but I have mislaid the reference.

It is generally combined with sarsaparilla, mezereum, dulcamara, or guaiacum, which promote its action upon the skin. It is often necessary to add opium, or Dover's powder, to prevent griping or diarrhœa. The addition of ♏xx of dilute nitric acid is useful in syphilitic affections. It is often combined with antimonials.

Externally, corrosive sublimate has been employed in the form of ointment, and of lotion in various skin diseases; but it has been thought that this is not a safe mode of using it, and is now seldom resorted to from the fear that, the eruption being *driven in*, bad consequences may ensue. On this important point see Trousseau's experience below. It has been advantageously used in the treatment of onychia maligna, by mixing it with an equal weight of sulphate of zinc, and sprinkling it thickly upon the ulcer, which is to be then covered with lint soaked in tincture of myrrh.* Combined with liquor potassæ or lime-water (gr. ij to ♏xv of liq. potassæ, or to f℥j of lime-water), it is in constant use under the name of *yellow wash*, as a stimulating lotion to languid syphilitic or scrofulous ulcers.

In *eczema* in infants, Trousseau says, "When the eczema is very acute and accompanied by great redness and abundant discharge, mercurial baths are to be preferred, prepared by dissolving one grain of corrosive sublimate in a few drops of spirit, and adding this quantity to each quart of water. I have used these baths for fourteen years, in every variety of dartrous affection of the skin, with the greatest advantage. Some practitioners consider them dangerous, but I order about 1000 annually, and even for women in the weakest state, and children of the earliest age, without ever seeing any accidents result from their employment. I have had children placed in these baths, half the skin of whose body had been destroyed by eczema, and no injurious absorption of the mercury has taken place, whilst the epidermis has been regenerated in a few days. Very young infants should not be kept in the bath more than a quarter of an hour, but those who are more than a year old may be retained in it for half an hour.

The severest forms of eczema, lichen, erythema, and impetigenous eczema, soon yield to these baths, and they form the most appropriate treatment to the syphilitic eruptions of infants.†

Dr. Inman confirms the advantage and safety of this plan from his own experience, after trying it on Trousseau's recommendation.

Dose.— Gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$. The best form for its administration is the officinal solution. It may, however, be given in the solid form, made into a pill by some extract of gentian or hop, or bread crumb. For *baths* gr. j in every quart of water.

Incompatibles. — Alkalies and their carbonates, except as in the above-mentioned formula for *yellow wash*. It is not likely to be prescribed with other incompatible substances, except iodide of potassium, which, though chemically incompatible, forms a compound (see Biniodide of Mercury), esteemed by some surgeons.

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* United States Dispensatory.

† Med. Chir. Rev. N. S. vol. iii. Ap. 1846, p. 549.

LIQUOR HYDRARGYRI BICHLORIDI, *L.*

SOLUTION OF BICHLORIDE OF MERCURY.

Synonyme. Liquor Hydrargyri Oxymuriatis.

Take of Bichloride of mercury,
Hydrochlorate of ammonia, each, ten grains.
Distilled water, a pint.
Dissolve.

Remarks.—The hydrochlorate of ammonia renders the bichloride of mercury more soluble than it would otherwise be.

Medicinal properties and uses.—See HYDRARGYRI BICHLORIDUM, p. 496.

Strength of solution.—Each fluid ounce contains half a grain of bichloride of mercury.

Dose.—fʒj (gr. $\frac{1}{16}$) to fʒij (gr. $\frac{1}{8}$). A larger quantity is liable to cause griping and purging. It should be given in combination with a compound decoction of sarsaparilla, mezereon, guaiacum, or infusion of linseed.

HYDRARGYRI CHLORIDUM, *L.D.E.*

CHLORIDE OF MERCURY. CALOMEL.

Synonyme. Calomelas, *D.E.*, Mercurius Dulcis Sublimatus. Hydrargyrus Muriatus Mitis. Hydrargyri Submurias. Hydrargyri Protochloridum. Hydrargyri Subchloridum.

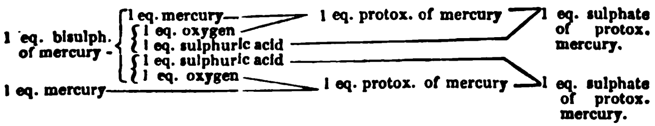
Take of Mercury, four pounds.
Sulphuric acid, twenty-one fluid ounces and a half.
Chloride of sodium, a pound and a half.

Boil two pounds of the mercury with the acid until the bipersulphate of mercury remains dry; rub this, when it is cold, with two pounds of mercury in an earthenware mortar, that they may be perfectly mixed; afterwards add the chloride, and rub them together until globules are no longer visible; then sublime. Rub the sublimate to very fine powder, and wash it carefully with boiling distilled water, and dry it.

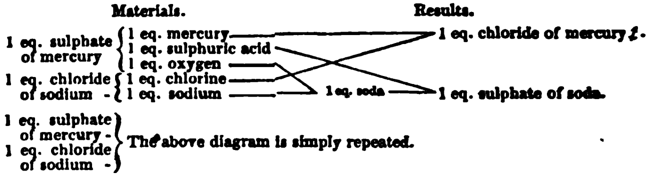
D. Take of Sulphate (persulphate) of mercury, ℔x; Mercury, ℔vii; Dried chloride of sodium, ℔v. The directions are the same as the London ones until the period arises for subliming. This operation is to be continued in a covered crucible, the head of which contains a plug that admits of removal at pleasure, until the portion of the sublimate which adheres to this plug no longer contains globules of metallic mercury, nor becomes yellow when touched by solution of caustic potash. When cool, the sublimate is to be removed into another vessel, which communicates with a chamber or *very* large receiver, and again sublimed. The sublimate will settle upon the floor of the chamber or receiver as a very fine powder.

E. In this case, the quantity of mercury ordered is just double that prescribed for the corrosive sublimate (see p. 491.); but the quantities of all the other materials are the same. Half the mercury prescribed is to be treated as in corrosive sublimate, until a dry salt is obtained, which is to be well mixed with the other half of the mercury and the common salt, and sublimed as directed in the Ph. L. The sublimate is to be washed "until the water ceases to precipitate with solution of iodide of potassium."

Process.—It will be seen, on comparing the ingredients for making this compound with those for making the bichloride of mercury (p. 490.), that the quantities of sulphuric acid and of chloride of sodium are the same, but that double the quantity of mercury is employed in this instance. The following is the reason for this difference: the sulphuric acid is boiled with two pounds of mercury exactly as in the preceding instance, and the bipersulphate of mercury remains, as was there shown. But here, the object is to combine 1 eq. only of chlorine with 1 eq. of mercury, and some plan must therefore be devised by which the 2 eqs. of oxygen can be removed and replaced by 1 eq. only of chlorine. This object is accomplished by rubbing the bipersulphate with another equivalent of fluid mercury, which removes one of the equivalents of oxygen, and also 1 eq. of sulphuric acid; and when the combination is completed, there are 2 eqs. of protosulphate (sulphate) of protoxide (oxide) of mercury, instead of 1 eq. of bisulphate of binoxide and 1 eq. of metallic mercury.

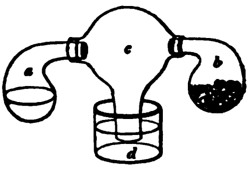


These 2 eqs. of sulphate of protoxide of mercury are then rubbed with the 2 eqs. of chloride of sodium, as before; but in this instance each eq. of chlorine combines with 1 eq. of mercury, and thus 2 eqs. of protochloride (chloride) of mercury are formed, instead of 1 eq. of bichloride. The sulphate of soda is formed as before, and remains in the crucible, whilst the chloride of mercury is sublimed by the heat employed.


Materials.
Results.
1 eq. sulphate of mercury
1 eq. mercury
1 eq. sulphuric acid
1 eq. oxygen
1 eq. chloride of sodium -
1 eq. chlorine
1 eq. sodium
1 eq. soda
1 eq. chloride of mercury.
1 eq. sulphate of soda.
1 eq. sulphate of mercury -
1 eq. chloride of sodium -
The above diagram is simply repeated.

In the above diagram, only half the materials have been accounted for, in order to avoid confusion; but it will be seen that the same ingredients remain, and in the same proportions, for forming the second equivalent of chloride of mercury, and the second equivalent of sulphate of soda.

The apparatus employed by different chemists for subliming the chloride varies considerably, and occasions variety in the appearance of the compound, but without any chemical difference. When a large crucible is used which is covered with a hemispherical head, the chloride of mercury forms a solid cake, the exterior of which is convex, corresponding with the interior of the head; and the sublimate is frequently crystalline. As formed in this way, it generally has a yellowish colour, which it retains even when reduced to powder.



The accompanying sketch illustrates the method proposed by Mr. Jewell, in which *a* is a retort containing water, and *b* one containing the materials for making the chloride of mercury. When both are heated, the vaporised calomel passes into the receiver, *c*, and here meets with the steam from *a*, by which it is condensed, and falls, as an impalpable powder, into the cold water in *d*. When made in this way, it is quite colourless, and in a much finer state of division than can be obtained by powdering the mass formed by the process first described.

Properties.—Chloride of mercury is a very heavy powder (sp. gr. 7·2), colourless, or having a slight yellow tint, insoluble in water, alcohol, or ether. Many spring waters, however, especially those of Edinburgh, partially decompose it at a boiling temperature, and convert it into bichloride of mercury and metallic mercury (*Christison and Donovan*), and confection of bitter almonds, which is used in France, and contains a small quantity of hydrocyanic acid formed from the almonds, gradually converts calomel into bichloride and bicyanide of mercury; and some fatal cases of poisoning have occurred in that country from this source.* Muriate of ammonia, common salt, and syrup of almonds also convert it into bichloride (*Mialhe*).

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* Prescriber's Comp. Handbook, Trousseau and Reveil, translated by the author, p. 111.

A solution of hydrochlorate of ammonia in distilled water produces the same effect. Boiling nitric and sulphuric acids convert it into bichloride of mercury, and form sulphate or nitrate of mercury; and boiling hydrochloric acid effects the same change, but sets some metallic mercury free. Solutions of the alkalies and of ammonia and lime-water decompose it, and form a black oxide of mercury. Chloride of mercury is entirely volatilised by heat, and, at the same time, is *very slightly* resolved into metallic mercury and corrosive sublimate. It is slowly decomposed under the influence of light, becoming darker, owing to the liberation of mercury, as is commonly supposed, or, according to Pereira, to the formation of a subchloride.

Composition.—Chloride of mercury consists of

1 eq. mercury, 202; 1 eq. chlorine, 36 = HgCl.; eq. 238.

Characters and tests.—Powdered, nearly white; it is sublimed by heat. It becomes black on the addition of potash, and then, on the application of heat, runs into globules of mercury. Nothing is thrown down from the water in which it has been boiled or washed, on the addition of nitrate of silver, lime-water, or hydrosulphuric acid.

E. Sulphuric ether agitated with it, filtered, and then evaporated to dryness, leaves no crystalline residuum; and what residuum may be left is not turned yellow with aqua potassæ.

Chloride of mercury is *recognised by* the absence of colour, its insolubility, its volatility, and the black colour formed when it is triturated with lime-water or a solution of the alkalies.

It is liable to be *intentionally adulterated* with *fixed* white powders, such as chalk, plaster of Paris, or sugar, &c., or with *volatile* powders, such as muriate of ammonia. The first adulteration is at once detected by the whole not being sublimed from platinum foil on the addition of heat. If the ammoniacal compounds are present, they would be sublimed, but they may be detected by shaking up the powder in distilled water, and adding solution of nitrate of silver, which would detect the hydrochloric acid, if the hydrochlorate was present; on adding to the solution, a solution of sulphate of copper and a drop or two of solution of potash, a deep blue colour would be produced if ammonia was present in any form. Or the powder might be mixed with an equal weight of dried potash, and heated in a test tube; if ammonia, in any form, was present, a piece of moistened turmeric paper, held in the mouth of the tube, would become brown.

It may be *accidentally adulterated* with bichloride of mercury from imperfect washing. On boiling the powder in distilled water, or agitating it in ether, this will be dissolved and detected by the addition of nitrate of silver, which would cause a white precipitate of chloride of silver; by hydrosulphuric acid, which would produce a black precipitate of bisulphuret of mercury; and by limewater or aqua potassæ, which would cause a yellow precipitate of hydrated binoxide of mercury. The ethereal solution, when evaporated, would also leave a *crystalline* residuum.

Powders for which it may be mistaken.—Its appearance alone does not distinguish it from other white powders, but it is so much heavier than any other officinal powder, that it is in no danger of being mistaken. The characters given above, effectually distinguish it in any case of doubt.

Medicinal properties.—In *moderate* doses (gr. j to gr. vi), chloride of mercury acts as a *purgative*, especially if combined with other aperient medicines, though, when given alone, its purgative effects are somewhat uncertain. In many persons it causes great prostration, nausea, and griping; and it generally acts more mildly with children than with adults. It promotes the secretion and excretion of bile, and causes *slimy bilious* stools in *adults*, and frequently *green* ones in *infants* and *children*. This effect is not peculiar to calomel, being induced also by the continued use of magnesia, and is attributed to various causes, viz. to a chemical action upon the bile, to action upon milk in the alimentary canal, or to a peculiar (unknown) influence upon the liver. It cannot be strictly called a *diuretic*, though it *promotes* the *action* of this class of remedies, on which account it is frequently combined with squill or digitalis. It is generally a safe and mild medicine, but, in some cases, the smallest doses produce violent effects, and there are some persons in whom two grains of calomel produce severe salivation. This peculiarity of habit is termed *idiosyncrasy*, because we do not understand it. The operation of *large* doses (℈j to ʒss) differs remarkably from that of small ones; the former being *sedative*, and the latter *irritant*. This effect has been chiefly noticed by practitioners in the East, and is so well established, that it seems placed beyond doubt. In the dysentery and fever of the East, it is given in doses of a scruple to half a drachm, which are repeated once or oftener in the day. Instead of causing purging or nausea, it checks both, and allays the irritation of the mucous membrane which gives rise to them; and also promotes the excretion of the bile. Annesley* attributes these effects to a chemical influence exerted upon the thick tenacious mucus lining the intestines, and, as he supposes, mechanically obstructing the orifice of the gall duct; and the experiments which he describes give some countenance to this opinion.

Chloride of mercury is given as an *alterative* in many cases in which the secretions, generally, are defective or disordered. When administered with this view, it is generally combined with antimonials, as in Plummer's pill (pil. hydr. chlor. co.), and is given in small (one grain) doses which are repeated daily for some time. Under this treatment, the health frequently improves, and various morbid conditions disappear without any marked effect being produced upon any of the secretions or excretions.

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* Diseases of India, 8vo. 1831, ch. v.

Calomel is scarcely regarded as a *poison*, but a few cases have been recorded in which it has produced severe enteritis and salivation, terminating in death.

Characteristics of chloride of mercury as a purgative. — It is uncertain, if administered alone; but is generally certain, if combined with other purgatives. It causes *bilious* stools in adults, *green* ones in children, and frequently occasions much nausea, griping, and depression. If frequently administered it induces salivation and the general effects of mercurial compounds, and it assists the operation of diuretics more than other aperients. It causes less griping, and acts more certainly and mildly in doses of three grains to half a scruple, than in one or two grain doses, and is less severe in its effects upon children than upon adults. It is more frequently used than any other purgative, in the treatment of inflammatory affections.

Uses. — Chloride of mercury is the most common form for the administration of this mineral, and it is given in almost all the cases in which mercurial compounds are advisable. These are so fully detailed under the uses of mercurial compounds generally (see page 487.), that they need not be repeated in this place.

Calomel is specially employed in a few cases which are chiefly local affections. It is sometimes blown into the eye, for the *removal of opacity* or *specks of the cornea*, which is most conveniently effected by placing one or two grains in the small end of a quill, open at both extremities, and blowing it smartly upon the cornea, once or twice a week. This should not be attempted, if any acute inflammation is present in the eye. Dr. Laner of Berlin has found calomel of great utility in strumous ophthalmia of infants, accompanied with great intolerance of light. He dips a camel's hair pencil into the calomel and gently shakes the powder into the eye by tapping the brush upon the finger of his opposite hand. It gives scarcely any pain, and should be used once a day. It generally cures in a few days (ten to fourteen).* Calomel is daily used, under the name of black wash, in the treatment of nearly every form of venereal sores. This lotion is prepared by mixing ℈j or ʒss of calomel with eight ounces of lime-water.

In two constitutional affections, calomel has been largely employed, in preference to any other mercurial compound, viz. in the *acute dysentery of eastern countries*, and in *Asiatic cholera*. In the latter disease it has been administered in every conceivable variety of dose and combination, and almost incredible quantities have been given, and the patients have recovered; or, as the reporters of the cases have stated, have been cured by it. But the records of this fatal disease only confirm the remark of one of our great military commanders in the East. "At the first appearance of the disease, all the men who were attacked by it died, and the medical officers in the service acknowledged themselves entirely unable to arrest its progress. But after some time I was informed, by first one and then another, that he had at length found a plan of treatment which was successful, and that now he was curing all his patients. On enquiry, however, I found that though each was equally successful and equally confident in the superiority of his own plan, no two of them agreed in their mode of treatment, and what was now curing all the patients had failed to save any when the disease first broke out." Thus, in the experience of some, bleeding has been everything, and others have found it nothing without warm water and neutral salts; whilst others again have found nothing so useful as drinking plenty of cold water, which has been most rigidly forbidden by a fourth class. Some have found immense doses of calomel every hour irresistible, and others have effected all their cures by acetate of lead and opium; and one of the most extensive, and according to popular report successful, practitioners in the north of England relied upon opium and stimulants, to the exclusion of almost every thing else.

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* Chemist, vol. v. p. 44.

The foregoing account was written previous to the visitation of cholera in 1849, and, unfortunately, still holds but too true. Nevertheless, in this town*, in which the disease prevailed with extreme severity, there was a gradually increasing confidence in the beneficial effects of calomel given in doses of one or two grains *every ten or fifteen minutes*, as recommended by Dr. Ayres, either with or without as much camphor; and under this plan I have repeatedly seen patients rally when they were in the last stage of collapse, — blue, cold, and pulseless; the vomiting and purging have been checked, and the pulse and natural heat of the body have returned. This result, unfortunately, however, has been so far from uniform, that in the report on cholera by the College of Physicians, it is shown that less than 50 per cent. of the persons thus treated recovered, whilst from 45 to 55 per cent. recovered, whatever the nature of the treatment might be. Facts thus far, therefore, are against even an average benefit from the employment of calomel in any way.† It was generally observed that constipation, rather than diarrhœa, prevailed during the convalescence of patients treated in this way.

Incompatibles. — There is no medicinal substance incompatible with chloride of mercury that is likely to be combined with it. At one time there was a great dread of giving acids along with calomel, lest it should be converted into the poisonous bichloride; but this fear was founded upon a mistaken view of its chemical relations. They do sometimes, however, cause griping when given together. In France fatal accidents have occurred from combining calomel with a confection containing bitter almonds.

Dose and administration. — The dose of chloride of mercury varies much with the object of its employment. As an *alterative* gr. j, once or twice a day, combined with antimonials or guaiacum, as in the pil. hydr. chlor. co. As a *purgative*, gr. ij is a small dose, combined with colocynth or jalap; gr. iij to gr. vi, combined with gr. xv of jalap, or gr. v of scammony or compound extract of colocynth, is an efficient and speedy purgative; gr. x may be given with a grain of opium at night, and followed by senna and salts in the morning. In some cases, the larger doses have been followed by unexpectedly severe effects. As a *diuretic*, gr. j is combined with squill or digitalis, and repeated twice or three times daily. When the object is to produce salivation, gr. j or gr. ij, combined with gr. $\frac{1}{4}$ of opium, may be given every three or four hours, or once or twice a day only, according to the object in view; but a larger quantity is generally requisite in the north than in the south of England, and in country places than in London; and students going to town from the north, or from country districts, are often surprised to find the small doses which are administered in some of the London hospitals. Mr. Law has observed that, if $\frac{1}{12}$th of a grain of calomel is given with some soft extract every hour, salivation is generally induced in thirty-six hours; whilst if a larger dose is employed, the effect is not so quickly produced. In three cases in which I have tried this plan it failed to excite salivation in the time specified; and even if it should be found to answer better in other instances, it is a mode which scarcely admits of employment, owing to the difficulty of giving a medicine to a patient every hour, and to the uncertainty of knowing whether it is regularly administered.

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* Liverpool.

† Rep. on Cholera by the Coll. of Phys., Dr. Gull's part.

When mixed with a few grains of bicarbonate of soda it is less liable to cause griping than when given alone.

HYDRARGYRI AMMONIO-CHLORIDUM, *L. D. E.*

AMMONIO-CHLORIDE OF MERCURY.

Synonyme. Hydrargyri Precipitatum Album, *E.* Mercurius Præcipitatus Albus. Calx Hydrargyri Alba. Chloramide. Chloro-amidide of Mercury. White Precipitate.

Take of Bichloride of mercury, six ounces.
Distilled water, six pints.
Solution of ammonia, eight fluid ounces.

Dissolve the bichloride, with the application of heat, in the water. To this, when it is cold, add the ammonia, frequently stirring. Wash the powder thrown down until it is free from taste; and lastly dry it.

Decomposition.—When ammonia is added to solution of bichloride of mercury, a white precipitate is formed, which is the present preparation. Very great difference of opinion prevails among chemists as to the nature of the changes which take place, and the composition of the precipitate; but the compound itself is so unimportant, that I shall not occupy the student's time by dwelling upon theories which scarcely admit of proof, and which are changing from year to year. The obscure nature of the compound furnishes plenty of room for ingenuity in devising explanations which, though widely different from one another, are all of nearly equal authority. All chemists are agreed that it consists of

2 eqs. merc.; 2 eqs. chlorine; 2 eqs. nitrog.; 6 eqs. hydrog.; and 2 eqs. oxygen.

and with this statement I shall content myself, and refer the reader to Phillips's translation for fuller details upon this particular point.

Properties.—Ammonio-chloride of mercury is the lightest of the mercurial compounds. It is colourless; is entirely volatilised by heat; is insoluble in alcohol, ether, or water, but when boiled in the latter fluid it is decomposed into hydrochlorate of ammonia and an insoluble yellow powder. It is soluble in nitric, hydrochloric, and sulphuric acids. When heated with potash, ammonia is evolved, and a *yellow* powder remains, by which it is distinguished from calomel, which is rendered *black* by liquor potassæ.

Characters and tests.—Powdered, white; it is sublimed by heat; it is dissolved, without effervescence, in hydrochloric acid; it exhales ammonia when heated with solution of potash, and assumes a yellow colour.

It is often adulterated with chalk or plaster of Paris. Neither of these is volatilised by heat, and the first would be detected by effervescing in hydrochloric acid.

Powders for which ammonio-chloride of mercury may be mistaken.—All the white powders of the Pharmacopœia. It is distinguished from all except chloride of mercury by being volatilised by heat; and from this by the action of caustic potash and heat, which turn white precipitate yellow, but make calomel black.

Medicinal properties and uses.—Ammonio-chloride of mercury is never used internally, but it is supposed to be an active poison. It is only employed in the form of ointment, as an external application to skin diseases, as porrigo, impetigo, herpes, and ophthalmia tarsi.

Officinal preparations.—Ung. Hydrarg. Am.-chlor.

HYDRARGYRI NITRICO-OXYDUM, *L. D. E.*

NITRICO-OXIDE OF MERCURY.

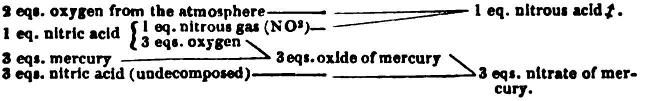
Synonyme. Red Precipitate. Hydrargyri Oxydum Rubrum, *D. E.* Hydrargyri Binoxidum.

Take of Mercury, three pounds (℥viii, *D.*).
Nitric acid, eighteen fluid ounces (f℥iij, *D.*).
Distilled water, two pints (f℥vi, *D.*).

Mix, and apply a gentle heat until the mercury is dissolved; boil down the liquor, and rub what remains to powder; put this into another very shallow vessel; then apply a slow fire, and gradually increase it until red vapour ceases to arise.

E. Take of Mercury, ℥viii; Diluted nitric acid (sp. gr. 1·280), f℥v. Dissolve half the mercury in the acid, with the acid of a gentle heat; and continue the heat till a dry salt is formed. Triturate the rest of the mercury with the salt till a fine uniform powder is obtained; heat the powder in a porcelain vessel, and constantly stir it till acid fumes cease to be discharged.

Process.—When mercury is gently heated in dilute nitric acid, as here directed, part of the acid is decomposed, and oxidises the mercury, while the remainder combines with the oxide. The changes may be more exactly represented as follows; Nitric acid consists of 1 eq. of nitrogen, and 5 eqs. of oxygen. 1 eq. of the acid is decomposed, and gives up 3 eqs. of oxygen, leaving the remaining 2 eqs. combined with the single eq. of nitrogen. These fly off together in the form of nitrous gas, NO^2; but meeting with oxygen in the air, they combine and form nitrous acid, NO^4, which is characterised by its suffocating red fumes. These are the fumes evolved when mercury is heated in the acid. The 3 eqs. of oxygen derived from the 1 eq. of decomposed acid, combine with 3 eqs. of mercury, and form 3 eqs. of oxide of mercury. Each of these combines with 1 eq. of undecomposed nitric acid, and forms nitrate of oxide of mercury; or, as it is commonly termed, nitrate of mercury.


Materials.
Results.
2 eqs. oxygen from the atmosphere
1 eq. nitrous acid ↑.
1 eq. nitric acid
1 eq. nitrous gas (NO^2)
3 eqs. oxygen
3 eqs. mercury
3 eqs. oxide of mercury
3 eqs. nitric acid (undecomposed)
3 eqs. nitrate of mercury.

When this salt is heated, the nitric acid is decomposed, and forms, as before, nitrous gas, and 3 eqs. of oxygen. The oxygen remains in combination with 3 eqs. of oxide of mercury, forming 3 eqs. of binoxide of mercury, whilst the nitrous gas combines with oxygen from the atmosphere, and flies off in red fumes of nitrous acid. A very small quantity of nitrate of mercury sometimes escapes decomposition, and remaining mixed with the binoxide, has given rise to the inaccurate title of "nitrico-oxide of mercury." The name "red oxide of mercury" of the Phs. Dub. and Ed. is correct enough.

The Edinburgh process is stated to be more economical than the London one, "as the nitric acid, which would otherwise be discharged, is partly employed in oxidating the mercury" (*Christison*).

Properties. — Nitrico-oxide of mercury is in small brillant red scales. It sometimes contains a minute portion of undecomposed nitrate of mercury, which gives rise to red fumes when it is heated in a tube. When in contact with fatty matters it is slowly decomposed, and partially reduced to the metallic state: hence the ointment acquires a dark colour, when long made.

Composition. — Nitrico-oxide of mercury is essentially binoxide of mercury, and is called so in the Ph. Ed. The presence of any undecomposed nitrate of mercury is quite accidental. Its composition and symbol are, therefore,

1 eq. mercury, 202; 2 eqs. oxygen, $16 = HgO^2$; eq. 218.

Characters and tests. — It consists of shining red crystalline scales, and is sublimed (in metallic globules, *E.*) by a considerable heat. It emits no nitrous fumes. It is dissolved by nitric and hydrochloric acids.

The only probable impurity is the presence of a small quantity of undecomposed nitrate, which would evolve nitrous fumes. It is distinguished from *red lead* by being volatile; from *biniodide of mercury* by being volatilised in globules of metallic mercury; and from *bisulphuret of mercury* by being soluble in hydrochloric and nitric acids. It is not likely to be confounded with any thing else.

Medicinal properties and uses. — Nitrico-oxide of mercury is *escharotic*, and is only used externally. In the form of ointment it is applied as a stimulant to some ulcers (see UNGUENT. HYDRARG. NITR.-OXYD.), and it is sprinkled in its ordinary state upon fungous granulations.

Officinal preparations. — Unguent. Hydrarg. Nitr.-oxyd.

HYDRARGYRI IODIDUM, *L. D.* (VIRIDE, *D.*).

(GREEN, *D.*) IODIDE OF MERCURY.

Synonyme. Ioduret of Mercury.

Take of Mercury, an ounce.
Iodine, five drachms.
Alcohol, as much as may be sufficient.

Rub the mercury and iodine together, adding the alcohol gradually, until globules are no longer visible. Dry the powder immediately, with a gentle heat, without the access of light, and keep it in a well-stopped black glass bottle.

Process.—The only difference between this and the next preparation, consists in the proportions used. In this, the quantities are such as to represent exactly equal equivalents of both mercury and iodine, and when simply rubbed together they quickly combine and form the iodide of mercury. At the beginning of the trituration the compound has a red colour, which is owing to the formation, in the first instance, of biniodide of mercury; but as the process is continued, the whole of the mercury gradually combines with the iodine; the biniodide at first formed is converted into iodide, and the colour changes from red to greenish-yellow. It is necessary to add a few drops of alcohol frequently, during the process, to keep the materials moist. If large quantities (more than seven or eight ounces) are employed, so much heat is evolved as sometimes to cause an explosion.

Properties.—Iodide of mercury is a greenish-yellow powder, but when heated it becomes crystalline, bright red, and is sublimed. If the heat is not continued long enough to sublime it, the bright red colour spontaneously returns to yellow on cooling. When long exposed to the light, it is slowly converted into metallic mercury and biniodide. It is insoluble in water or alcohol, but is slightly soluble in ether and in solution of iodide of potassium.

Composition.—Iodide of mercury consists of

1 eq. of mercury, 202; 1 eq. of iodine, $126 = \mathrm{HgI}$; eq. 328.

Characters and tests.—When fresh, it is yellowish. When heat is cautiously applied, it is sublimed in red crystals, which, after a time, become yellow, and afterwards, if exposed to light, black. It is not dissolved by (a boiling solution of) chloride of sodium.

It is not liable to adulteration, and the above characters merely distinguish it from other yellowish powders. If an excess of iodine has been used, or it has not been sufficiently triturated, a small quantity of biniodide will be present, which is soluble in solution of chloride of sodium, from which it is deposited on cooling.

Powders for which it may be mistaken.—*Iodide of lead; ammonio-chloride of iron; tersulphuret of arsenic; powdered mustard.* It is distinguished from all these, except the arsenious compound, by its volatility when heated; and from that, by its insolubility in liquor potassæ, in which the tersulphuret of arsenic is soluble.

Medicinal properties and uses.—It has been used with success in the various forms of scrofula, in all of which it has proved useful, especially when there is a syphilitic taint at the same time. It has also been used in the treatment of the syphilis of infants. It occasions salivation, like all the compounds of mercury, if long continued in considerable doses; but it does not exhibit any peculiarities in this respect.

Dose and administration.—It is always given, when used internally, in the form of pill, in doses of gr. j increased to gr. iij; to infants, Ricord gave gr. $\frac{1}{8}$. It is also externally used in the form of ointment.

Incompatibles.—It is not likely to be combined in pills with any incompatible substance, except iodine; and this is only incompatible, because it combines with it, and forms a compound of greater activity than the original one.

HYDRARGYRI BINIODIDUM, *D. E.*

Biniodide of Mercury.

Synonyme. Hydrargyri Iodidum Rubrum, *D.* Deutioduret of Mercury. Red Iodide of Mercury.

E. Take of Mercury, one ounce.
Iodine, ten drachms.
Concentrated solution of muriate of soda, half a gallon.

Triturate the mercury and iodine together, adding, occasionally, a little rectified spirit, till a uniform red powder be obtained. Reduce the product to fine powder, and dissolve it in the solution of muriate of soda with the aid of brisk ebullition. Filter, if necessary, through calico, keeping the funnel hot; wash and dry the crystals which form on cooling.

D. Take of Corrosive sublimate, one ounce.
Iodide of potassium, ten drachms.
Distilled water, two pints, or as much as is sufficient.

Dissolve the corrosive sublimate with the aid of heat, in twenty-five ounces, and the iodide of potassium in five ounces of the water, and when both solutions are cold, mix them. Decant the supernatant liquor when the precipitate has subsided, and having collected this latter upon a paper filter, wash it with the remainder of the water. Finally, dry the product at a temperature not exceeding 212°, and preserve it in a close bottle.

Process.—The only important difference between the Edinburgh process and that for iodide of mercury is, that twice the quantity of iodine is here used, which corresponds with two equivalents instead of one, and so forms biniodide instead of iodide. It is a case of simple combination, without any decomposition. If large quantities of the materials are used, the process is attended with the evolution of a dangerous amount of heat, but there is no fear of this in making six or seven ounces at a time. Biniodide of mercury is soluble in a boiling saturated solution of common salt, and the Ph. Ed. orders it to be dissolved, and, as it cools, the biniodide is again deposited as a beautiful red precipitate. By this means, any iodide is removed, as it is not soluble in the solution of chloride of sodium, and uncombined mercury or iodine is also left behind. By the Dublin process, the biniodide is obtained by double decomposition: 1 eq. of corrosive sublimate (bichloride of mercury) is decomposed by 2 eqs. of iodide of potassium; the 2 eqs. of chlorine leave the mercury, and are replaced by 2 eqs. of iodine from the two of iodide of potassium; the 2 eqs. of potassium thus set at liberty combine with the 2 eqs. of chlorine from the bichloride of mercury, and form 2 eqs. of chloride of potassium, which are washed away.

Materials.		Results.
2 eqs. iodide of potassium -	2 eqs. potassium	2 eqs. chloride of potassium.
	2 eqs. iodine	
1 eq. bichloride of mercury -	2 eqs. chlorine	
	1 eq. mercury	1 eq. biniodide of mercury ↓.

Properties.—Biniodide of mercury, however made, is a powder of a remarkably deep and beautiful red colour, which, unfortunately, is not permanent when exposed to light and air, though it undergoes scarcely any change from the influence of light alone. It is volatile, and when sublimed, or even heated to a degree much below that of sublimation, as on a piece of common card, it assumes a crystalline structure and a yellow colour. It is said, that the colour becomes red on cooling, but I have never found this to be the case. It has always remained yellow, until mechanically disturbed, as by rubbing it with the nail or point of a knife, when it immediately becomes red. It is insoluble in water; but is dissolved by boiling alcohol, by some acids and alkalies, and by solution of iodide of potassium, chloride of sodium, and bichloride of mercury. On this account, care is necessary to avoid using too much iodide of potassium as a test for bichloride of mercury; for the biniodide of mercury which is formed, is redissolved by excess of the iodide of potassium. When heated with potash it is decomposed, iodide of potassium is formed, and metallic mercury sublimes.

Composition.—Biniodide of mercury consists of

1 eq. of mercury, 202; 2 eqs. of iodine, 126×2, 252; $=HgI^2$; eq. 454.

Characters and tests.—*E.* Entirely vaporisable; soluble entirely in forty parts of a concentrated solution of muriate of soda at 212°, and again deposited in fine red crystals on cooling.

Powders for which biniodide of mercury may be mistaken.—*Binoxide*, *nitrico-oxide*, or *bisulphuret of mercury*. From all these it is distinguished by its colour becoming yellow when it is heated, and returning to red when the yellow crystals are crushed. *Pre-*

cipitated (hydrated) *tersulphuret of antimony; sesquioxide of iron; red lead*; and *litharge*. From all these it is distinguished, not only by its colour, but by its volatility when heated.

Medicinal properties and uses. — Biniodide of mercury possesses the combined properties of mercury and iodine, and is an active preparation. It sometimes salivates, and Pereira has known it cause excruciating pain when applied to ulcers. He states that it is nearly as powerful as the bichloride, and quotes Rayer as thinking it still more active. This is not a universal experience, for it is often given in repeated doses of half a grain to a grain, with benefit; which would be an unsafe, if not poisonous, quantity of bichloride of mercury. It exerts a beneficial influence, not only upon syphilis and scrofula, conjoined, but upon the latter disease alone, in removing glandular enlargements, and improving the general health. In the Northern Hospital in Liverpool, it has been given with benefit in syphilitic ulcerations of the throat, and in secondary eruptions. It has been also applied in the form of ointment, to languid scrofulous and syphilitic ulcers. I have, however, given it perseveringly for weeks at a time, but in vain, in order to remove scrofulous enlarged glands. My own experience of it is not favourable; it has exerted little influence, good or bad. It was formerly in the London Pharmacopœia, but is now removed from it.

Dose and administration. — It is most conveniently given in the form of pill, with confection of dog roses. Mr. Horton of Leeds, who has used it extensively in scrofula, prefers giving it in powder mixed with white sugar. It is never prescribed in the form of mixture.

The usual dose at the commencement is gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$, and some persons never exceed the latter dose, finding it to produce the desired results. At the Northern Hospital in this town the dose is never less than gr. ss, three times daily, gradually increased to gr. j. It has caused slight salivation once in that hospital.

Incompatibles. — It may be given at the same time with iodide of potassium. It is incompatible with sulphur and with nitric acid, which are the only incompatible substances likely to be combined with it.

HYDRARGYRI BISULPHURETUM, *L.E.*

Bisulphuret of Mercury.

Synonyme. Cinnabar. Hydrargyri Sulphuretum Rubrum, *D. E.* Vermilion.

Take of Mercury, two pounds.
Sulphur, five ounces.

Mix the mercury with the sulphur melted over the

fire, and, as soon as the mass swells, remove the vessel from the fire, and cover it closely, lest inflammation should occur; then rub (the mass) to powder, and sublime it.

Process. — This is another example of simple combination between the mercury and the sulphur, which takes place even in the cold, but much more rapidly when they are heated together. If large quantities of the materials are used, the mass sometimes takes fire, with explosion, the prevention of which is the object of closely covering the crucible and removing it from the fire when it begins to swell.

Properties. — When in the mass, bisulphuret of mercury or artificial cinnabar has a deep brownish-red colour, and a striated, but not regularly crystalline appearance. When reduced to powder it is termed vermilion, and becomes a much brighter red, and loses the brown tint. When prepared by precipitation from any of the bisalts of mercury by means of hydrosulphuric acid, the bisulphuret has a deep black colour, which becomes red on being sublimed. Its sp. gr. is very high. It is volatile when heated, and sublimes unchanged if heated alone in close vessels; but if freely exposed to the air, or if lime or potash is present, or it is mixed with organic matter, it is decomposed, and metallic mercury sublimes; some metals also produce the same effect upon it. It is insoluble in water, alcohol, ether, oils, or any unmixed acid, except the sulphuric, which decomposes it at a boiling temperature, and forms sulphate of mercury, with the evolution of sulphurous acid. The chlorine present in nitro-hydrochloric acid decomposes it, and dissolves the mercury.

Composition. — Bisulphuret of mercury consists of

1 eq. of mercury, 202; 2 eqs. of sulphur, $16 \times 2, 32 = HgS^2$; eq. 234.

Characters and tests. — It is sublimed by heat (and without any globules being formed, *E.*); but if potash is added it passes into globules of mercury.

If adulterated with red lead, the fraud is detected by its not being entirely volatilised by heat.

Powders for which bisulphuret of mercury may be mistaken. — All those mentioned under "HYDRARGYRI NITRICO-OXYDUM." It is distinguished from all but the mercurial compounds by its great weight, and its volatility when heated; and from these it is distinguished by being sublimed unchanged, and by the absence of any effect on the addition of cold nitric acid.

Medicinal properties and uses. — Pure cinnabar is inert, and in the solid form is never used medicinally. In the state of vapour it is employed as a fumigation in the treatment of syphilitic ulceration of the throat and nose; but in this state it is not bisulphuret of mercury, but a mixture of metallic mercury and sulphurous acid, the compound being decomposed when sublimed in the air.

Dose and administration.—ʒss is generally used for fumigation, which is effected by putting the powdered cinnabar upon a hot plate of iron, and conducting the vapour to the throat or nose through a metallic funnel made for the purpose, or through a sheet of paper rolled into an open cone, so that the wide end shall cover the hot iron, and the small open end be applied to the ulcerated surface. The late Mr. Colles of Dublin recommended a more convenient mode of application under the form of *mercurial candles.* The intended quantity of cinnabar is to be melted with a small quantity of tallow or wax, and made into a candle upon a wick of cotton. This may then be burnt under a glass funnel (access of air being allowed), and the vapour directed upon the affected part He speaks of this plan of treatment as being peculiarly efficacious in the obstinate ulcerations which occur about the roots of the nails (*Neligan*). (See also MERCURIAL CIGARETTES, below.)

HYDRARGYRI PERNITRATIS LIQUOR, *D.*

SOLUTION OF PERNITRATE OF MERCURY.

Take of Pure mercury, two ounces.
Pure nitric acid, one fluid ounce and a half.
Distilled water, one fluid ounce and a half.

In the acid, first diluted with the water, dissolve the mercury, with the application of heat, and evaporate the solution to the bulk of two ounces and a half.

Properties and uses.—*Powerful caustic*, when undiluted; when diluted, a stimulating detergent. It has been applied in its undiluted state, by means of a camel's hair pencil, to syphilitic ulcers of the throat; but in one instance it caused violent closure of the epiglottis and death, a few minutes after its application. When used in the proportion ♏j to ♏ij to an ounce of water, it forms a useful gargle in similar cases.

MERCURIAL CIGARETTES. (Not Off.)

Nitrate of mercury is employed in France for making *mercurial cigarettes*, according to the following formula:—

Nitrate of mercury, gr. xv.
Nitric acid, gr. xv.
Distilled water, fʒvi.

Mix the acid and water, and dissolve the salt in the mixture, and in the solution soak a piece of white blotting-paper eight inches by six. Dry it and divide it into eight slips, which are to be twisted up into cigarettes before they become perfectly dry. One or two of these are to be smoked daily, and the smoke is to be swallowed or inhaled, or forced through the nostrils, according to the purpose for which they are used. Unless the paper is folded before it is perfectly dry, it becomes so brittle that it frequently cracks and breaks in the twisting.

Properties and uses.— Of the benefit derived from these cigarettes I can speak with confidence, having used them in several cases of loss of voice (aphonia) of many months' standing, and of chronic offensive discharge from the frontal sinuses. The mercurial vapour is by this means applied directly to the seat of the disease, and speedy improvement and eventual cure were the result. The smoke when inhaled produces but little irritation, and does not excite cough after the first two or three times.

HYDRARGYRI SULPHAS OR PERSULPHAS, *D.*

Sulphate or Persulphate of Mercury.

Take of Quicksilver of commerce, ten ounces.
Oil of vitriol of commerce, six fluid ounces.

Heat them together in a porcelain capsule until effervescence ceases, and nothing remains but a white and dry crystalline salt.

Remarks. — This is only used for making calomel. For the chemical changes which take place, see Hydrarg. Bichlor. 1st diagram, p. 491.

PRÆPARATA EX MAGNESIO.

PREPARATIONS OF MAGNESIUM.

MAGNESIUM. *Symb.* Mg. Eq. 12.

Remarks. — Magnesium is the metallic base of magnesia, but it is scarcely known beyond the fact of its having been obtained in an isolated form. It quickly attracts oxygen from the air, and is converted into magnesia.

MAGNESIA, *L. D. E.*

Magnesia.

Take of Carbonate of magnesia, a pound.

Burn it for two hours in a strong fire (in a full, *E.*, dull, *D.*, red heat in a loosely covered crucible till it ceases to effervesce in acids, *D. E.*).

Process. — When carbonate of magnesia is exposed to a full red heat, its carbonic acid is driven off, and the caustic alkali remains in the crucible. It does not require so high a temperature for calcination as carbonate of lime. The character of the product varies considerably according to the way in which the heat is applied, and other circumstances which are not yet fully ascertained: this is shown by the two kinds of magnesia in common use, one of which is termed "light" and the other "heavy" magnesia, though the composition of the two does not appreciably differ.

Mr. R. Phillips *, jun., finds that if a carbonate of magnesia is first formed by the usual process, and the whole saline matter is evaporated to dryness, and calcined without the previous separation of the sulphate of soda, the magnesia which is left when this salt is washed away after calcination is heavy; whilst if prepared according to the Pharmacopœia, it is light. Christison † states that a low heat produced the light magnesia, whilst a higher temperature makes it heavy. He quotes Dr. Dumain's opinion, that Henry's and Howard's heavy magnesia is obtained by precipitating the earth from one of its salts by means of caustic potash, instead of first converting it into a carbonate and afterwards calcining it.

Properties. — Calcined magnesia is a white, gritty, inodorous powder, either tasteless or slightly bitter. It is insoluble in water, but if moistened and laid upon turmeric paper it turns it brown. As commonly prepared it is very light and bulky, and there is some difficulty in mixing it with water, which are great objections to its employment. The French prefer it light, whilst in England, the heavier it is, the more it is esteemed. It does not, like lime, give off heat when mixed with water, but slowly absorbs carbonic acid from the air, and is very apt to cake in the bottle if it is not carefully closed. It possesses the curious and inconvenient property of forming a gelatinous mass when combined with solution of sulphate of magnesia and various tinctures, of which, tincture of colchicum furnishes a good example. This is sometimes so firm and unyielding that it cannot be removed from the bottle, and heat has little influence in softening it.

Mr. Bell finds that all tinctures or wines containing mucilaginous ingredients increase this effect, and that gum added for the purpose of suspending the magnesia is worse than any thing else. The sulphate of magnesia is decomposed, and forms an insoluble subsulphate by combining with the magnesia. Magnesia also forms a solid mass when combined with about sixteen times its weight of copaiba.

Composition. — Magnesia consists of

1 eq. of magnesium, 12; 1 eq. of oxygen, 8=MgO; eq. 20.

Characters and tests. — When moistened with water, it slightly changes the colour of turmeric to brown. It is dissolved by hydrochloric acid without effervescence. Nothing is thrown down from this solution on the addition of bicarbonate of potash, or of chloride of barium.

E. 50 grs. are entirely soluble without effervescence in f℥j of muriatic acid; an excess of ammonia occasions in the solution only a scanty precipitate of alumina; the filtered fluid is not precipitated by solution of oxalate of ammonia.

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* Pharm. Jour. vol. iii. p. 480.

† Dispensatory, p. 608.

Magnesia is not fraudulently adulterated, but it may contain carbonic acid from imperfect preparation at first, or from subsequent exposure to the air, in which case it will effervesce with hydrochloric acid. Lime is sometimes present, derived from the magnesian limestone from which it is originally obtained (see Magn. Sulph. p. 522.), which is shown by the bicarbonate of potash and the oxalate of ammonia; sulphate of magnesia or of soda, from careless preparation (see Magnes. Carb. p. 518.), may be present, and will be indicated by a precipitate on the addition of chloride of barium.

Powders for which it may be mistaken. — Almost all the white powders in the Pharmacopœia. In general, however, its great lightness distinguishes it, without having recourse to the above tests.

Medicinal properties. — *Antacid; mild laxative.* It is probably itself inert, but it readily combines with acids in the stomach and bowels, and forms salts, all of which are aperient. It is preferred to the carbonate in flatulent colic and great acidity in the stomach, and also in cases of poisoning by the mineral acids, in consequence of its freedom from carbonic acid; and it is thought, on the same account, to be more suitable for infants and young children; but a fair trial of the two will prove that the advantage is less than is often supposed; and the difficulty with which it is diffused through water and the bulkiness of the dose are great disadvantages. It frequently produces *green* stools when given to infants. Chalk should generally be given in preference to magnesia, in cases of poisoning with acids, as the salts of the latter are purgative, and likely to increase the diarrhœa which sometimes arises independent of any aperient medicines. Caution must be observed not to give magnesia too long, as, owing to its insolubility, it sometimes accumulates in the bowels, and becoming concreted by the intestinal mucus, collects into masses, which occasion very unpleasant symptoms. Pereira quotes the case of a lady who had taken several pounds of magnesia, in whom it was found concreted into a mass in the caput coli, weighing nearly six pounds.

Characteristics of magnesia as a purgative. — It is very bulky, and has little taste, is exceedingly mild in its operation, and uncertain if given alone. It should never be used when it is an object to act quickly or certainly upon the bowels.

Uses. — *Dyspepsia*, dependent upon acidity of the stomach; *heartburn; pyrosis; dyspeptic headache.* As a *laxative* it is in very general use for infants, being safe and having little taste. In *gout* it is often employed to correct the acid state of the gastric secretions, and it is of great value in some cases of *lithic acid calculus*, or disposition to undue deposit of lithates, in which the alkalies or their carbonates do not agree. It is often used to check the vomiting of early pregnancy, and to allay the heartburn of this condition; but it must not be too long continued, and, in many of these cases, a regulated course of mineral acids and

tonics are infinitely more useful. In *poisoning* by the mineral or oxalic acids it is given, if chalk cannot conveniently be obtained.

***Dose and administration.*— In dyspepsia it is taken alone, or with some aromatic water, as anise or mint. As a *laxative* it is generally combined with some other aperient, chiefly rhubarb, or sulphate of magnesia.**

***Dose.*—Gr. iij to gr. v, for infants; for adults, gr. xv to ʒss.**

***Incompatibles.*—Acids and acidulous salts, though it is sometimes prescribed with lemon juice, which forms citrate of magnesia; and it is sometimes added to acetate of colchicum, to neutralise the acid. It is incompatible with some tinctures, and sulphate of magnesia together, in consequence of forming a gelatinous insoluble compound in the bottle.**

MAGNESIÆ CARBONAS, *L. D. E.*

CARBONATE OF MAGNESIA.

***Synonyme.* Magnesia alba. Magnesiæ Subcarbonas.**

Take of Sulphate of magnesia, four pounds.
Carbonate of soda, four pounds and nine ounces.
Boiling distilled water, four gallons.

Dissolve separately the carbonate and sulphate in two gallons of the water, and strain; then mix the liquors and boil them, stirring constantly with a spatula for two hours (ten minutes, *D.*; fifteen, *E.*); distilled water being frequently added, that it may fill nearly the same measure: lastly, the liquid being poured off, wash the precipitated powder with boiling distilled water, and dry it.

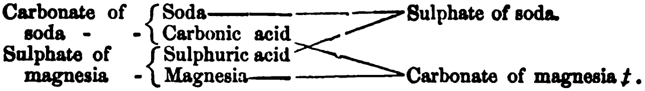
MAGNESIÆ CARBONAS PONDEROSUM, *D.*

HEAVY CARBONATE OF MAGNESIA.

Take of Sulphate of magnesia, ten ounces.
Crystallised carbonate of soda, twelve ounces.
Boiling distilled water, a sufficient quantity.

Dissolve the sulphate of magnesia in half a pint, and the carbonate of soda in a pint of the water; mix the two solutions, and evaporate the whole to dryness by a sand-bath. Digest the residue for half an hour with one quart of boiling distilled water, and having collected the insoluble matter on a calico filter, treat it repeatedly with warm distilled water, until the washings cease to give a precipitate, when suffered to drop into a solution of nitrate of barytes. Finally, dry the product at a heat not exceeding 212°.

Process.—When sulphate of magnesia and carbonate of soda are brought together in solution, both are decomposed; the carbonic acid of the carbonate of soda combines with the magnesia of the sulphate of magnesia, and forms carbonate of magnesia, which is insoluble, and is precipitated; and the sulphuric acid set free combines with the soda and forms sulphate of soda, which remains in solution and is washed away.



The carbonate falls as a bulky hydrate, combined with much water; but in the process of drying it becomes partially decomposed and loses a portion of its carbonic acid, which is driven off as gas. If the solutions are mixed at a boiling temperature, this takes place immediately, and before any attempts are made to dry it. In whatever way or in whatever proportions the two salts are combined, the same chemical changes take place; but the appearance and some of the properties of the result are much modified by circumstances which are at present very imperfectly understood. Common carbonate of magnesia is a very light bulky powder, not easily miscible with water, and which often collects in lumps or clots, that can scarcely be rendered smooth and uniform by the most careful management. There is another kind, commonly termed "heavy carbonate of magnesia," which is much heavier, mixes immediately and uniformly with water, and never forms clots in the mixture. The difference between the two appears to be merely mechanical, for the analyses of Mr. Phillips, Dr. Brett, and Dr. Fownes show that they agree entirely in composition. The mode of preparing the heavy carbonate, which is most esteemed in this country, is kept secret by the manufacturers, the chief of whom are Messrs. Howard and Messrs. Henry. The incompleteness of our knowledge on the subject appears from the very different formulæ given by different authors for accomplishing the same object. Pereira directs to "add one volume of a *cold saturated* solution of carbonate of soda to a *boiling* mixture of a saturated solution of sulphate of magnesia, and three volumes of water; boil until effervescence has ceased, constantly stirring with a spatula; then dilute with boiling water, set aside, wash the precipitate, and dry it in an iron pot." * I have tried this plan, which succeeds with the exception of a very slight grittiness. Bucholz †, on the contrary, directs *boiling* solutions of four parts of sulphate of magnesia in twenty-four parts of water, and four parts and three quarters of carbonate of soda in fourteen parts of water, and afterwards boiling for a few minutes; both which solutions, it will be seen, are much more dilute than those directed by

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* Materia Medica.

† Quoted by Christison, Dispensatory.

Pereira, and both are boiling. It is well known to chemists that boiling a precipitate often makes it collect and subside quickly, though it may require hours if not so treated; and the College, in the present Pharmacopœia, has directed the precipitate of carbonate of magnesia to be boiled for two hours instead of a quarter of an hour, as was formerly ordered, the object being, apparently, to make the carbonate collect more readily and become heavier. The Dublin College tries to accomplish the same thing by evaporating both the carbonate of magnesia and sulphate of soda to dryness together, and then removing the latter by washing.

Properties.—Carbonate of magnesia is a white, inodorous powder, often described as being insipid; but the common light carbonate generally has a bitter taste, and is unpleasant to many palates. It is insoluble in water, but mixes with it with some degree of difficulty. It is readily dissolved by dilute sulphuric or hydrochloric acid, with effervescence, owing to the escape of carbonic acid. It does not change on exposure to the air; but when heated to a point somewhat below that necessary for "burning" lime, the carbonic acid is driven off, and caustic magnesia remains. When freshly precipitated, it is soluble in excess of carbonic acid, upon which property the plans for making soluble magnesia depend. "Heavy" or "Howard's" carbonate differs in some respects; but the differences have been mentioned in the preceding section.

Composition.—Both the heavy and the light varieties agree in composition *, and uniformly consist of

	Light.	Heavy.	
Magnesia - - - - - -	42·8	41·2 or	41·2
Carbonic acid - - - -	36·0	36·4	35·6
Water - - - - - - -	21·2	22·4	23·2
	100·0	100·0	100·0

Phillips's analysis corresponds with this, and he supposes it to be a compound of

1 eq. of bihydrated magnesia, $MgO + 2\,HO$ - - - eq. 38
4 eqs. hydrated carbonate of magnesia, $4\,MgO.CO^2,HO$ - eq. 204

Symb. $MgO + 2\,HO + 4\,MgO,CO^2,HO$; eq. 242

Characters and tests.—It is dissolved by diluted sulphuric acid. From this solution, when effervescence has ceased, nothing is thrown down by bicarbonate of potash. The water in which it has been boiled does not change the colour of turmeric to yellow, nor does it throw down any thing on the addition of chloride of barium or nitrate of silver.

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* Dr. Fownes, Pharm. Journ. vol. iii. p. 478.

E. When dissolved in an *excess* of hydrochloric acid, an excess of ammonia occasions only a scanty precipitate of alumina, and the filtered liquid is not precipitated by oxalate of ammonia.

The only probable impurities are sulphate of soda and alumina. For the nature and effect of the tests, see MAGNESIA, *Tests*, p. 516.

Powders for which carbonate of magnesia may be mistaken.— All the white powders in the Pharmacopœia. It is distinguished from the whole by being insoluble in water, but readily soluble, with effervescence, in dilute sulphuric acid; and, from the solution thus obtained, a white precipitate is thrown down by solution of potash, which is *not* dissolved by excess of the test; and no colour or precipitate is produced by hydrosulphuric acid.

Medicinal properties and uses.—Antacid; absorbent; lithontriptic; aperient. It is used in cases of *acidity of the stomach* and in *acid* states of the *urine*, causing or increasing the formation of *lithic acid calculi.* If, however, the urine is alkaline, its administration cannot produce anything but mischief. In *dyspepsia* occasioning foul tongue and pain in the forehead, in fact, in most forms of disordered digestion, it is beneficially combined with sulphate of magnesia. In *heartburn*, especially when attendant upon pregnancy, it is sometimes taken in enormous quantities; but the remarks made under the article on mistura cretæ are equally applicable and necessary in this case. It is a common and useful aperient for children, in whom acidity of the primæ viæ is very common; but it is not so efficient for adults, as the dose for them must be large. It is seldom given alone as an aperient, but is generally combined with rhubarb and ginger, in which combination it forms the well-known Gregory's powder. It was at one time supposed to be a specific for that variable disease "sick headache," if taken with lemon juice whilst effervescing; and in many intances it is unquestionably useful. It is a valuable antidote in cases of poisoning by oxalic or sulphuric acids, but is not preferable to chalk, if that can be obtained. It is used for the purpose of dissolving volatile oils in water, without the necessity for distillation; but waters which have been prepared in this way become flocculent at last, from the deposition of a small quantity of the carbonate, which is slowly separated from the water after an interval of some months.

Characteristics of carbonate of magnesia as an aperient.— See MAGNESIA, p. 517.

Dose and administration.— When given in repeated doses, gr. vi to gr. x, or gr. xv. In a single dose, gr. xv to ℈j. For infants or children, gr. ij to gr. v, in repeated doses; and it is an advantage to add a little simple syrup to the mixture containing it. It is generally prescribed in the shape of mixture.

Incompatibles.— Carbonate of magnesia is not likely to be prescribed with any incompatible substances. It should not be given with the mineral acids; but though lemon juice is, in one sense, incompatible, yet it is often advantageously combined with it, the citrate of magnesia which is produced, being a useful compound.

FLUID MAGNESIA. (Not Off.)

AQUA MAGNESIÆ BICARBONATIS.

It has been stated above that carbonate of magnesia is soluble in excess of carbonic acid, upon which circumstance the formation of this fluid depends. Carbonate of magnesia is mixed with about twenty times its weight of water, and carbonic acid is forced into the mixture. The carbonate combines with another equivalent of carbonic acid, and forms bicarbonate, which is soluble in water, and is then bottled. When long exposed to the air, a portion of the carbonic acid escapes, and minute crystals are deposited of hydrated carbonate of magnesia. This is an agreeable and useful form for the employment of magnesia, and is free from the unpleasant impression produced upon the palate by the common carbonate.

MAGNESIÆ SULPHAS, *L. D. E.*

SULPHATE OF MAGNESIA.

Synonyme. Sal Catharticum. Epsom Salts.

Process. — This is an article of the Materia Medica, being prepared on the large scale, commercially; and no directions are given for its formation by the Colleges. It is principally obtained from two sources:

1st, *Bittern*, or the residual liquor after the separation of common salt from sea-water. This liquor is boiled until the whole of the common salt is separated; and the impurities being skimmed off, it is evaporated till crystals form on cooling, which are sulphate of magnesia. When obtained from this source, it generally contains a small portion of chloride of magnesium, which, being deliquescent, renders it moist in damp weather.

2nd, *Dolomite* or *magnesian limestone*. Various plans are adopted to convert this compound, which is a carbonate of lime and magnesia, into sulphate. Sometimes it is heated with dilute sulphuric acid, which forms sulphate of lime and sulphate of magnesia, the former of which is almost insoluble, whilst the latter is dissolved by water, and obtained in crystals on evaporating the solution. In the method invented by Dr. Henry, the carbonates of lime and magnesia are calcined, and afterwards moistened with water, and a sufficient quantity of hydrochloric acid is added to dissolve the lime, but not the magnesia. This, after being washed, is converted into sulphate by dilute sulphuric acid.

Properties. — Sulphate of magnesia is generally seen in small colourless crystals, the shape of which cannot be easily detected; but it is now often prepared in crystals nearly half an inch long, and which may be readily seen to be four-sided. The *primary form is a right prism with a rhombic base* (*Phillips*). It is soluble in its own weight of water, at 60°, and the solution has an intensely nauseous, bitter taste, so well known as not to require description. This offensive taste, which is the chief objection to the medicine, is almost entirely concealed by adding ʒj of bicarbonate of soda to ℥j of the sulphate of magnesia. In most cases the addition is not medicinally objectionable, and no precipitate is formed. If the salt has been prepared from bittern, it generally contains a portion of chloride of magnesium, which is deliquescent and renders the salt damp; but most of that now in the market remains dry in the air.

Composition.— Sulphate of magnesia consists of

1 eq. magnesia, 20; 1 eq. sulphuric acid, 40; 7 eqs. water, 9×7, 63 $=MgO,SO^3,7HO$; eq. 123.

Tests.—It does not moisten in the air: it dissolves in water; sulphuric acid being dropped into the solution, no hydrochloric acid is emitted.

The only probable impurity is a little chloride of magnesium, if the sulphate has been prepared from bittern. If any is present, the salt becomes moist; if it remains dry, it is a sufficient proof of its purity, without the sulphuric acid test.

Crystals for which sulphate of magnesia may be mistaken.— Sulphate of zinc; oxalic acid. The oxide of *zinc* is precipitated when liquor potassæ is added to a solution of sulphate of zinc, but is *redissolved* when the potash is added in *excess*. Magnesia also is precipitated from the sulphate by liquor potassæ, but is *not* redissolved by *excess* of potash. In general, however, the taste is quite sufficient to distinguish them, the sulphate of zinc being highly styptic, but not nauseous, and in this respect very different from the well-known bitter nauseous taste of Epsom salts. By far the most important mistake is that of taking oxalic acid for sulphate of magnesia. The distinctions between the two are arranged in a tabular form below.

Tests.	Sulphate of Magnesia.	Oxalic acid.
Taste - -	Nauseous bitter; not sour	Intensely sour.
Litmus paper -	Not reddened - -	Instantly reddened.
Bicarbonate of soda - -	No effect - -	Dissolves with effervescence.
Liquor potassæ -	White precipitate -	No precipitate.

Medicinal properties and uses.—Purgative; antiphlogistic.— It is in daily use in almost every case requiring purgatives. Its efficiency as a purgative is augmented by the addition of a few drops of dilute sulphuric acid, which also lessens its nauseous taste; but this is most effectually concealed by bicarbonate of soda.

Characteristics as a purgative.—Nauseous; efficient; seldom fails to purge; acts quickly (in from one to six hours), and upon the whole alimentary canal, causing increased mucous secretion, and thereby occasioning loose watery stools. It is, hence, useful in anasarca, though it does not deserve the name of a *hydragogue* cathartic. It reduces the force of the circulation, and produces general depression, but does not cause much griping or tendency to inflammation of the alimentary mucous membrane. Hence it is useful in almost all febrile states of the system, but is objectionable if there is great prostration.

Dose.—ʒj to ℥j, either at once or in divided doses. It acts most effectually in drachm or two drachm doses repeated every few hours, until the desired effect is produced.

Incompatibles.— Liquor potassæ and *carbonate* of soda or potash, but *not* the *bicarbonate*. The mineral acids may be advantageously combined with it.

PRÆPARATA E MANGANESIO.

PREPARATIONS OF MANGANESE.

MANGANESII BINOXIDUM, *L. D. E.*

Binoxide of Manganese.

Synonyme. Black Oxide of Manganese. Peroxide of Manganese. Oxide of Manganese.

Remarks.—This can scarcely be introduced into the preparations with propriety, as it is never prepared artificially, but is always found native. It is an article of the Materia Medica, and is merely placed in this work among the preparations, for the sake of convenience. It is found in considerable quantities in Cornwall and in Aberdeenshire in a mineral termed pyrolusite, in which it is generally mixed with some oxide of iron, carbonate of lime, sulphate of barytes, and clay, and it forms the chief portion of the sand on the sea-coast of some parts of New Zealand for miles in extent.

Properties. — It is a dense, black, insoluble powder, which is not volatile when heated, but is decomposed, and loses half an equivalent of oxygen, being converted into sesquioxide of manganese. It is soluble in hydrochloric acid, with the evolution of chlorine.

Composition. — When pure, binoxide of manganese consists of

1 eq. manganese, 28; 2 eqs. oxygen, 8×2, $16=MnO^2$; eq. 44;

but as found commercially, it never is pure, containing variable quantities of silica, oxide of iron, and other substances.

Tests and adulterations.—It is soluble in hydrochloric acid, evolving chlorine.

It is not liable to wilful adulteration; but it never is entirely dissolved by hydrochloric acid, owing to the presence of the above-named impurities.

Powders for which it may be mistaken.—Charcoal; oxide of mercury; sulphuret of mercury with sulphur; sulphuret of iron; sesquisulphuret of antimony. It is distinguished from them all by forming a beautiful violet or amethyst tint when fused with borax in the blow-pipe flame.

Medicinal properties and uses. — These, until lately, have been scarcely known, as it has been very seldom employed medicinally. Dr. Cowper has observed that it sometimes produces paralysis, unaccompanied by the constipation of lead colic, amongst the workmen employed in grinding it. Gmelin has noticed that the sulphate of the protoxide remarkably increases the secretion of bile, and sometimes also causes gastro-intestinal inflammation. Dr. Thompson, of Glasgow, has informed Dr. Christison that the same salt acts as a gentle aperient. Dr. Krigelin* has found the binoxide of great value in the treatment of scrofulous glandular enlargements in children, when used in doses of gr. ⅛ to gr. ¾. The binoxide is principally employed in chemistry and the arts; in the former, for supplying oxygen, when simply heated to redness; in the latter, for furnishing chlorine, by its action upon hydrochloric acid; for colouring glass and china; and for removing the brown colour communicated to glass, by the accidental presence of a portion of iron. It is introduced into the Pharmacopœia to furnish chlorine for the preparation of chloride of soda.

Dose. — The dose of binoxide employed by Dr. Krigelin, for children, is gr. ⅛ to gr ¾. It has been used in doses of gr. iij to ℈j in the treatment of cachectic affections, and the various forms of syphilis.

The employment of manganese has lately acquired additional interest from the researches of M. Dubuisson upon the blood in 1850. He found that manganese formed as constant an ingredient as iron in this fluid, and it is therefore, no doubt, as essential to its health; but as the proportion of iron varies in disease, so does that of manganese also. Thus in 1000 parts of blood taken from different classes of persons, there were

	Wt. of globules.	Wt. of ox. of iron.	Wt. of ox. of mang.
Plethoric man - -	143·500	1·360	0·071.
Average healthy man	128·200	1·220	0·060.
Chlorotic woman -	63·980	0·500	0·025.

In all these cases, the iron and manganese bear a close relation to each other, the manganese being about 1/20 of the iron; but on examining the total quantity we see that there is less than half the amount of manganese in a thousand parts of chlorotic blood that there is in the same weight of healthy blood; and we derive the indication to supply this metal, as well as iron, for the cure of chlorosis and anæmial conditions generally. Potatoes and many other kinds of food have long been known to contain manganese, and they supply it to the system in sufficient quantity for the maintenance, but not for the restoration of health. The failure of iron alone to cure chlorosis occurs sometimes to most medical men, and it is probable that greater success will attend the treatment, which combines both these remedies, than that which trusts to iron alone. Dr. Speer has suggested the following formula for the preparation of a saccharated carbonate of iron and manganese combined, which agrees with one proposed by M. Peterquin, and will probably be the one generally adopted in the absence of any authorised formula. For a more detailed account upon this subject, the reader may consult Dr. Speer's original paper in the Med. Times and Gazette, Dec. 1853, p. 598.; and Dr. Crane's paper in the Med. Times for Jan. 1854, p. 21.

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* Lancet, 1841-2, vol. i. p. 493.

MANGANESII ET FERRI CARBONAS SACCHARATUM.

(Dr. Speer.* Not Off.)

Saccharated Carbonate of Manganese and Iron.

Take of Sulphate of iron, three ounces and one drachm.
Carbonate of soda, five ounces.
Sulphate of manganese, one ounce and one scruple.
White sugar, finely powdered, two ounces.
Water, as much as is sufficient.

Dissolve the iron, soda, and manganese each separately in a pint and a half of water; mix the solutions and stir them well together; collect the precipitate on a cloth filter; wash it immediately with cold water; squeeze out as much water as possible, and without delay triturate the pulp with the sugar; and dry at a temperature of about 120° F.

Decomposition. — In this case carbonate of iron is formed as at p. 452., and carbonate of manganese is also formed in a precisely similar manner. The two carbonates are simply mixed together and triturated with the sugar before they have time to absorb more oxygen from the air whilst drying.

Description. — This powder is of a reddish-brown colour, and possesses no taste, except that of the sugar.

Medicinal properties and uses.—See Manganesii Binoxyd., *Med. Props.* p. 525.

Dose. — Gr. v, gradually increased to ℈j, three times a day.

MANGANESII SULPHAS. (Not Off.)

Sulphate of Manganese.

Synonyme. Sulphate of Manganous Oxide. Manganous Sulphate.

Take of Peroxide of manganese, one part.
Sulphate of iron (crystals), four parts.

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* Med. Times and Gaz. Dec. 1853, p. 598.

Rub them together, and ignite them gently for an hour. Dissolve what remains in water; filter, and evaporate until crystals begin to form. Then separate and dry the crystals.*

Remarks. — There are other methods of making this salt, but all agree in their general principle.

Decomposition.—Peroxide of manganese generally contains some iron and copper mixed with it, and the object of the ignition is to get rid of these impurities, as both of them are converted by a red heat and sulphuric acid into insoluble compounds, whilst the sulphate of manganese is not affected by it. The sulphuric acid of the sulphate of iron combines with the manganese, and forms sulphate of manganese, which is afterwards dissolved by the water, leaving the iron and copper in an insoluble form behind.

Composition. — Sulphate of manganese consists of

1 eq. ox. mang. $28+8$, 36; 1 eq. sulph. acid, $40 = MnO, SO^3$, eq. 76.

When crystallised, it contains 4 eqs. of water $MnO, SO^3, 4\ HO$, eq. 112; but the proportion of water is influenced by the temperature at which it is evaporated.

Properties. — Sulphate of manganese is in crystals, generally having a pale rose colour, but sometimes colourless, soluble in water either hot or cold.

Medicinal properties and uses.—Sulphate of manganese has been described above as a gentle aperient, but Mr. Long informs me that in his observation it has always produced griping and considerable uneasiness, and on one occasion excessive purging of a choleraic character, although the dose was only one drachm.

Dose. — ʒss to ʒj.

PRÆPARATUM E NICCOLO. (Not Off.)

PREPARATION OF NICKEL.

NICCOLI SULPHAS. SULPHATE OF NICKEL. (Not Off.)

This is a green salt, which I have introduced because it has been used by Prof. Simpson; but our experience of its utility is limited, so far as I know, to a single case, and I have not bestowed extended space upon it. He gave it in one-grain doses three times a day in a case of periodical headache; but the results, as reported by himself, are not such as to inspire great confidence in it.

Dose. — Gr. j two or three times a day.

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* Fischer, quoted in Gmelin's Handbook of Chemistry (Cavend. Society), vol. iv. p. 221.

LEAD. S

Remarks. — Lead is a wei
colour, soft and flexible, and v

It is not officinal or used in
sometimes employed in surgic
normal osseous growths or tum
the bones, such as nodes, wheth
lead is laid upon the tumour, an
in such a way as to produce a
maintained for a considerable l
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when on the Dreadnought Hospi
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according to his experience, was m
by this means, than by the contin
remedies. (See also effects of Coll
of shields made of lead is of very
tender or cracked nipples during s
forward so prominently by Dr.
which I remember amongst the ea
saw in use when an apprentice, ha
brough's shields, as if they were n
Doctor himself does not claim fo
forming a lactate of lead, by the
surface of the shield, which is appl
soothing and healing effect can sca
the prevention or cure of this painf
affection.

But though

acid from the air. The proportions of carbonate and oxide had not hitherto been carefully determined, but in some experiments which I made, I found that 80 grs. of the precipitate, when dried, contained 8·02 grs. of carbonate, and 71·97 grs. of oxide of lead, or very nearly one part of carbonate to nine of oxide.

The presence of another metal increases the effect of water considerably; for the crust which I obtained from a piece of pure lead weighed 5·5 grs., whilst that formed upon a piece of tea lead (which contains tin and lead) of equal size, and placed under exactly similar circumstances, weighed 11·5 grs. This action takes place with such rapidity, that distilled water will contain an appreciable quantity of oxide of lead, if it has simply passed through a leaden pipe, or been cooled by passing through a leaden worm from the still.

But though distilled water produces this effect, and cannot therefore be kept with safety in a leaden cistern, most spring waters exert scarcely any perceptible action, and may be safely kept in one for almost any length of time. A piece of common sheet lead was immersed in a lightly covered jar of spring water, from which the air was not excluded, for above six months; and at the end of that time its surface had acquired merely a very thin film, and the water was scarcely coloured when a stream of sulphuretted hydrogen was passed through it.

The different effects produced by distilled and spring water are explained as follows: — Most springs contain a small quantity of sulphate of lime, or some soluble sulphate. The sulphuric acid of this salt combines with the oxide of lead formed by the action of the air and water, and forms sulphate of lead, which is insoluble in water and adheres firmly to the metal. By this means it acquires a coating which prevents any further action of the water. With distilled water, on the other hand, the mixed carbonate and oxide are formed; but these, though insoluble, do not adhere firmly to the metal, but are removed by the slightest agitation. A fresh surface of lead is thus constantly exposed, and this effect continues until the whole of the metal is gradually destroyed.

Prof. Daniell has, however, remarked that spring water, if strongly impregnated with carbonic acid, which is the case naturally in some springs, dissolves an important and dangerous amount of lead. It is therefore necessary, before using leaden cisterns or leaden pipes for conveying water, to be satisfied that the water not only contains earthy salts, but is also free from any considerable quantity of free carbonic acid. Some dangerous consequences have also resulted from the employment of leaden cisterns as pickle tubs for curing meat. The brine quickly acts upon the lead, and chloride of lead is formed, which, being soluble, is mixed with the remaining brine and enters into the substance of the meat, producing the usual effects of lead poisoning. Dr. Taylor has also shown* that spring water containing nitrates acts rapidly upon lead, forming a soluble compound which is quickly dissolved from the surface, and affords no protection to the metal. In short, if the acid of the saline ingredients in the water is capable of forming a soluble salt of lead, hardness affords no protection; but if the acid forms an insoluble compound, then hard water acts as a protection to the leaden cistern or pipe.

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* Guy's Hosp. Rep. vol. iii. pp. 60—90.

The influence, however, even of sulphates and phosphates in protecting lead, has lately been called in question, and it has been stated,

1st. That *hard* water does not protect lead so well as *soft* water.

2nd. That even if moderately hard water protects lead, very hard water, on the contrary, acts rapidly upon it.

3rd. That magnesian salts are peculiarly injurious to lead.

4th. That water, hard from the presence of carbonates and chlorides, acts with peculiar rapidity upon lead.

Some of these statements have already been considered above but I made the following experiments in order to test the whole of them. Sheet lead, and common lead piping, were exposed to the action of water containing the following solutions, with the results now to be described. In every case the lead remained in the water for a week.

Description of Experiments.

In the 1st set of experiments, sheet and pipe lead were exposed to the action of a strong solution of sulphate of magnesia (gr. iv, and also gr. x to the ounce) in distilled water.

2nd set. The same solutions of sulphate of magnesia, combined with bicarbonate of soda (gr. iv to the ounce).

3rd set. Carbonate of magnesia, partially redissolved by carbonic acid gas in distilled water.

4th set. Carbonate of lime, partially redissolved by carbonic acid gas, in the same way.

5th set. Solution of common salt (gr. ½ to the ounce) in distilled water; and the same strength in the common spring water of Liverpool, which contains a moderate quantity of sulphate of lime.

6th set. Solutions of common salt, as above, only stronger (gr. ij to the ounce).

7th set. Solutions of common salt (gr. ½ and gr. ij in the ounce), in combination with gr. j and gr. iv of sulphate of magnesia, respectively; *i. e.* gr. ½ with gr. j, and gr. ij with gr. iv.

8th set. The same experiment, only substituting chloride of calcium for chloride of sodium.

Object of the Experiments.

It will be seen, on examining the above experiments, that nearly every point in dispute was brought under investigation, viz. the action of *hard* water, which does not contain sulphates, in experiments 3 and 4; the action of *strong* solutions of sulphates in experiment 1: the modifying effect of the presence of excess of carbonic acid along with the sulphate, in experiment 2; the effect of chlorides of various strength, in distilled water, and in water containing small and large amounts of sulphates of both lime and magnesia, in experiments 5, 6, and 7; the difference in the effect of chlorides of equal strength, dependent upon diversity in the base with which the chlorine is combined in experiments 7 and 8; and, lastly, the difference in the effect produced upon sheet lead and common pipe lead.

Results.

Different kinds of lead.—*The difference between the effect upon the sheet and the pipe lead was so slight in every case, as scarcely to merit notice;* if anything, the pipe lead was the least affected, as shown by the visible effect of sulphuretted hydrogen, for quantitative analysis was not resorted to in any instance. When, however, tea lead was operated upon, the difference was very great, which corresponds with results I obtained many years since, in which I found that, whilst the deposit from pure lead in a certain time weighed 5·5 grains, that from an equal surface of tea lead, placed under precisely similar circumstances, weighed 11·5 grains.

This result might almost be anticipated, since impurity in common pipe lead is more likely to be zinc than any other metal, and this would retard rather than hasten the action of the water upon the lead, by forming a galvanic arrangement; whilst the tin, which is stated to be present in tea lead, would hasten the action upon the lead, as it is less easily acted upon by chemical agents than lead itself. The difference in effect of the different strengths of the same solution was by no means strongly marked, the result being so nearly the same at the end of the week's trial that it is unnecessary to make any distinction, in speaking of them, between the solution of 4 grains of sulphate of magnesia, and that of 10 grains; between the ½-grain and the 2-grain solution of chloride of calcium, &c.

Sulphates.—The solution of sulphate of magnesia produced a very decided effect; the bottom of the jar in which the experiment was made became covered with a thick white layer, and a coating, similar in appearance, covered the surface of the lead, but was removed without difficulty by gently scraping with the nail; on transmitting sulphuretted hydrogen, the white sediment became a black powder, and the water assumed a brown hue. Thus it was clear that the *strong solution of the sulphate did not form a protecting layer upon the lead,* though repeated experiments, year by year, shown to my class of chemical students, has confirmed beyond dispute that the Liverpool water, which contains a *small quantity of sulphate of lime, does protect it.* It appears to me that the difference in the effect of a strong and a weak solution of a sulphate, is owing to the rapidity with which the precipitate is formed by the first, which prevents its adhering firmly; while in the second it is formed so slowly, that its adhesion is uniform and perfect.

Carbonates. — *All the carbonates acted upon the lead* so far as to cause the water to become decidedly coloured by the sulphuretted hydrogen; and a dark-coloured deposit was formed amongst the superfluous carbonate of lime and magnesia. The effect from the bicarbonate of soda was the most decided, and this, notwithstanding the presence of a small quantity of sulphate of lime in the common spring water, and of a large quantity of sulphate of magnesia in the distilled water; *whence it is evident, that neither a large nor a small quantity of a sulphate acts as a protection in the presence of a soluble carbonate.*

Chlorides. — In every case the water became brown on the transmission of the sulphuretted hydrogen, but *the solution of chloride of calcium had by far the most effect*, and a decided coating was formed upon the lead in it; which was not the case in any of the solutions of common salt, in which the lead retained its ordinary appearance, and no precipitate was found upon the bottom of the jars. *The effect of the chlorides was, therefore, less marked than that of the other solutions employed.*

Conclusions.

From the above experiments it is clear, that hard waters do not protect lead simply from the fact of their being hard; but that the protection, when effected, is dependent not only upon the nature of the salt causing the hardness, but also upon the proportion present: for, whilst all experience proves that a small amount of a sulphate, at any rate of a sulphate of lime, does protect the lead, a large quantity of sulphate of magnesia acted considerably upon it.

It appears, also, to be proved that chlorides act upon lead, whether with or without the presence of sulphates, but that their action is not so great as that of soluble carbonates, which produce a rapidly injurious effect upon the metal. At the same time, these results do not practically affect the question of the safety of using lead for common water, so far as sulphates, at any rate, are concerned; inasmuch as the solutions here employed were, out of all proportion, stronger than any ordinary spring water, and the experience of years has proved that there are no bad consequences practically occasioned by the employment of this metal for water containing sulphates.

Medicinal effects. — Metallic lead is not known generally to possess any medicinal properties, but some of the compounds of this metal produce poisonous effects, which may be better described in this place than under any of the individual preparations. Dr. A. T. Thomson has asserted that the carbonate is the only poisonous salt of lead, and that if the others act as poisons, it is owing to their conversion into carbonate: but this opinion is not generally admitted by toxicologists, and it is an established fact, that in large doses the acetate and diacetate are poisonous, even when free acid is present. A case of lead poisoning is, however, recorded (Br. and For. Med. Chir. Rev. Oct. 1852, p. 343.) as having been produced by chewing leaden bullets and shot to relieve severe thirst. The practice has been followed for four or five years before its injurious consequences were traced to the proper cause.

Symptoms of poisoning by lead.—Muscular debility, and loss of spirits; severe colic, which continues sometimes almost without intermission for hours or days; most obstinate constipation; and a peculiar blue line upon the gums, where they join the teeth. These symptoms may all disappear under proper treatment; but another which is frequently produced, is removed with much more difficulty: this is the "lead palsy." The extremities, and especially the hands, become paralysed and cannot be raised, which has given rise to the designation of "hand-drop," to characterise this symptom. Under proper treatment, however, this affection usually disappears, though very slowly. This affection is generally local, and unconnected with the spinal cord; and lead has been found in abundance after death in the muscles of the affected arm.

Treatment of poisoning by lead.—Preventive treatment, by scrupulous cleanliness previous to taking food, is of the first importance; and an immediate discontinuance of the exciting cause is indispensable, whether this be lead used medicinally, or more probably the poison insidiously introduced into the system by means of water impregnated with it. But of what may be called strictly remedial agents, iodide of potassium appears to stand the first, and accumulating evidence is before the profession of the influence of this agent in removing the lead from the system, by the channel of the kidneys. A case is reported by Dr. Nicholson* of a painter who suffered from colic and palsy. No lead could be detected in the urine even by the most delicate tests, until iodide of potassium was given in ten-grain doses three times a day. In nine days lead began to appear in the urine, and in twenty-one days it was readily detected, and the man recovered. The colic and constipation are frequently more effectually relieved by large doses of alum (see Alum, p. 388.), than by ordinary aperients; and if palsy remains after the employment of the preceding treatment, galvanism furnishes a valuable and generally successful means for removing this most enduring of all the symptoms of lead poisoning.

PLUMBI OXYDUM (SEMIVITREUM), *L. D. E.*

OXIDE OF LEAD (SEMIVITRIFIED).

Synonyme. Lithargyrum, *E.* Litharge.

Remarks upon the oxides of lead.—Lead combines with oxygen in four proportions, but one only of these compounds, viz. the protoxide, forms salts.

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* Lancet, Jan. 1854, p. 42.

Protoxide (*massicot*): of a yellow colour; fusible; forms the basis of all the salts of lead. When fused so as to form litharge, its colour becomes red.

Composition: —

1 eq. lead, 104; 1 eq. oxygen, 8=PbO; eq. 112.

Red oxide (*minium*); PLUMBI OXYDUM RUBRUM, *E.* Not considered to be a distinct oxide; does not form salts; is converted by acids into protoxide and peroxide; gives off oxygen when heated.

Composition:—

3 eqs. lead, 104×3, 312; 4 eqs. oxygen, 8×4, 32=Pb^3O^4; eq. 344; or,
2 eqs. oxide of lead, 2PbO; 1 eq. binoxide of lead, PbO^2=
$2\,\overline{\underline{PbO}}+PbO^2$; eq. 344.

Remarks. — Introduced for purifying strong acetic acid.

Remarks upon the protoxide of lead. — Litharge is placed in the Materia Medica, being an article manufactured on the large scale for commercial purposes. It is obtained by exposing melted lead to the continued action of a current of air. The metal absorbs oxygen, and the oxide thus formed floats upon the surface of the melted lead, from which it is continually skimmed off. It is afterwards exposed to heat, by which it is partially fused, and constitutes common litharge. Before being fused into a mass it is termed *massicot*. When litharge is quickly cooled it becomes green; when slowly cooled it is red; hence the outside of a mass of litharge is green, whilst the interior is red.*

Substances for which litharge may be mistaken. — *Nitrico-oxide of mercury*, and *ammonio-chloride of iron*. It is yellower and less red than the former; and is redder and in flatter scales than the latter. The effects of tests distinguish them all perfectly.

Properties. — Powdered litharge is in small, thin, shining, red scales, which have a high specific gravity. Dilute nitric acid dissolves nearly the whole; but acetic acid, which is sometimes stated to dissolve nearly the whole, leaves a considerable proportion undissolved. It is fusible at a high temperature, and is used for glazing common earthenware. When heated with oils or melted fats, it combines with the fatty acids and forms a soap, which is the basis of most of the plasters in the Pharmacopœia.

Uses. — Litharge is never used internally, and is only employed in the Pharmacopœia for making plasters and the various compounds of lead.

Characters and tests. — It is almost or entirely dissolved by dilute nitric acid; the solution becomes black on the transmission of hydrosulphuric acid; what is thrown down by potash is white, and on adding the test in excess is again dissolved. From 100 grains of this oxide, dissolved in dilute nitric acid, 135 grains of sulphate of lead are thrown down on the addition of sulphate of soda.

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* Leblanc, Pharm. Journ. vol. v. p. 231.

E. 50 grains dissolve entirely, without effervescence, in f℥jss of pyroligneous acid, and the solution precipitated by 53 grains of phosphate of soda remains precipitable by more of the test.

The black precipitate with sulphuretted hydrogen, and the white with potash, show the substance to be lead; and the precipitate from sulphate or phosphate of soda being of the proper weight proves the absence of adulteration.

PLUMBI OXIDUM RUBRUM.

Red Oxide of Lead. Red Lead. (See p. 534.)

PLUMBI ACETAS, *L. D. E.*

Acetate of Lead.

Synonyme. Saccharum Saturni. Cerussa Acetata. Plumbi Superacetas. Sugar of Lead.

The following directions are from the Ph. E., the London College having placed it in the Materia Medica.

Take of Litharge, fourteen ounces.
Pyroligneous acid (sp. gr. 1·034), two pints.
Distilled water, one pint.

Mix the acid and water; add the litharge; dissolve it with the aid of a gentle heat; filter; concentrate the solution sufficiently for crystallisation on cooling.

Process.—This is a case of simple solution. The acetic (pyroligneous) acid dissolves nearly the whole of the oxide of lead, and forms acetate of lead, which is dissolved by the water employed in the operation.

Properties.—Acetate of lead is generally in colourless lumps, which have a crystalline structure, and strongly resemble in appearance pieces of loaf sugar; its taste is also so sweet as to have given rise to the name, "sugar of lead." It has a peculiar, somewhat sickly odour; is entirely soluble in a small quantity of hot or cold water, and the solution is at first transparent, but if exposed to the air it soon becomes opaque from the formation and precipitation of carbonate of lead, owing to the carbonic acid of the air combining with the oxide of lead. Water containing carbonic acid also decomposes it, and so do all alkaline carbonates. If a stream of carbonic acid is passed through a solution of acetate of lead, one half of the salt is converted into carbonate and precipitated, and binacetate of lead remains in solution (*Phillips*).

The crystals are usually so small that their form is not easily detected. The *primary* form is a *right oblique-angled prism* (*Phillips*).

Characters and tests. — It is dissolved by water (acidulated with acetic acid, *E.*). What is thrown down from this solution by carbonate of soda, is white; by iodide of potassium, yellow. Furthermore, it becomes black from hydrosulphuric acid; sulphuric acid, when added, evolves acetous odours. From 100 grains dissolved in water, 80 grains of sulphate of lead are thrown down on the addition of sulphate of soda.

E. 48 grains thus dissolved are not entirely precipitated by a solution of 30 grains of phosphate of soda.

Acetate of lead is seldom perfectly soluble in water, owing to the presence, generally, of a small portion of carbonate, formed from exposure to the air. The addition of a little acetic acid dissolves this. The above tests show the nature of the compound, carbonate of soda forming white carbonate of lead; iodide of potassium, yellow iodide; and hydrosulphuric acid, black sulphuret of lead. The weight of the precipitate proves the absence of adulteration.

Composition. — Acetate of lead consists of

1 eq. oxide of lead, 104 + 8, 112; 1 eq. acetic acid, 51; 3 eqs. water, 9 × 3, 27 = $PbO,\bar{A},3HO$; eq. 190.

Salts for which it may be mistaken. — The only substance at all likely is *loaf sugar*, from which it is distinguished by its crystalline structure, its smell, and colour, and the effect of tests.

Medicinal properties. — *Locally applied*, acetate of lead acts as an *astringent;* and, when taken internally, it has a remarkable power of *checking hæmorrhages*, *diarrhœa*, and *profuse mucous secretions*. It *lowers* the *heart's action*, and, if taken in *excessive doses*, acts as an *irritant poison;* but there are scarcely any recorded instances of death resulting from its effects. If given in large doses, and very long continued, it may produce lead colic; but there is much less danger of this than is often feared, and it may be safely given in doses far larger than are ever employed medicinally.

Uses. — *Diarrhœa and dysentery.* It is a most valuable remedy for these diseases when they have become chronic, being given in doses of gr. ij or gr. iij, combined with powdered opium, several times daily. In *menorrhagia* and threatened *abortion*, when the discharge of blood is large, it is often useful. In *hæmoptysis* it is of great value; and it is also employed in *hæmatemesis* and *discharge of blood from the bowels;* but in these latter cases it often produces less benefit than the mineral acids, especially the sulphuric and sulphate of magnesia. In *bleeding* from the *nose*, and, indeed, in *hæmorrhages* generally. In *acute* or *chronic bronchitis*, to check profuse secretion, it may be combined with hyoscyamus or Dover's powder. In *English cholera* it is often useful, when joined with opium; and it seemed to be beneficial in some cases of *Asiatic cholera*. It is used as a palliative, to check the sweating of *phthysis;* and of *hectic*, depending upon whatever cause.

Locally, in the form of solution, it is used as an *astringent* and *cooling* application in several cases mentioned under Liquor Plumbi Diacetatis. In the proportion of f ʒij of Liq. plumb. to f ʒvi of tincture of opium, it often affords very great relief to external piles when applied on a piece of lint. It causes severe smarting for a few seconds, which is speedily followed by ease. The mixture is what is called "unchemical."

Incompatibles. — *Sulphate of magnesia*, which might be given with it as a refrigerant. *Dilute sulphuric acid*, and *compound infusion of roses*, into which this acid enters. Both these form insoluble and inert sulphate of lead; but there is no objection to their employment if a short interval elapses between the periods of swallowing the saline or acid and the acetate of lead. For an injection, sulphate of zinc may be combined with it, and though sulphate of lead is precipitated, acetate of lead remains in solution, which is a most valuable astringent in the latter stages of gonorrhœa. As a *collyrium* it ought to be in excess, if combined with tincture of opium with the intention of combining an anodyne and an astringent; for insoluble and inert meconate of lead is formed, and acetate of morphia alone would otherwise remain in solution. *All the soluble carbonates* are incompatible with acetate of lead.

Dose and administration. — Acetate of lead is mostly given in the solid form, made into a suitable mass with confection of dog roses. The usual dose is gr. ij; but it may be safely and sometimes advantageously given in doses of gr. v, or more, several times daily. It is often combined with opium. Dr. A. T. Thomson recommends that it should generally be combined with excess of acetic acid; but his views, which have been already stated, are not confirmed by the experience of the profession generally.

LIQUOR PLUMBI DIACETATIS, *L.D.E.*

Solution of Diacetate of Lead.

Synonyme. Liquor Plumbi Subacetatis, *D.* Goulard's Extract of Lead.

Take of Acetate of lead, two pounds and three ounces (℥vi, *D.*).
Oxide of lead, rubbed to powder, one pound and four ounces (℥iv, *D.*).
Distilled water, six pints (Oij, *D.*).

Boil them for half an hour, frequently stirring, and when the liquor is cold, add of distilled water as much as may be sufficient to fill six pints (Oij, *D.*): lastly, strain. Let it be kept in well-stopped bottles.

Process.—When oxide of lead is boiled in acetic acid, in the proportions of one equivalent of each, acetate of lead is formed, as has been before described; but the acetic acid is capable of combining with another equivalent of oxide of lead, and of forming a subsalt, consisting of 2 eqs. of oxide of lead and 1 eq. of acid, which is termed a *diacetate.*

The proportions ordered in the Pharmacopœia are such as would be requisite if all the materials employed were pure; but as the oxide of lead generally contains some impurity not soluble in acetic acid, the quantity ordered is slightly too small to convert the whole of the acetate into diacetate. This is, however, of no consequence, as the preparation is only used externally, and there is no important difference between the properties of the two compounds. The proportions and strength ordered by the Edinburgh College are the same as those of the Ph. L.; but the Dublin solution is only about two-thirds as strong.

Properties.—When prepared according to the directions in the Pharmacopœia, the solution of diacetate of lead is colourless, and has a sweetish, astringent taste. It is decomposed by hard water, the sulphates and carbonates in which form insoluble sulphate or carbonate of lead; and it ought therefore to be diluted with *distilled* water whenever dilution is required. It is decomposed by all soluble sulphates and carbonates, which are therefore incompatible with it.

Composition.—Diacetate of lead consists of

2 eqs. oxide of lead, 112×2, 224; 1 eq. acetic acid, 51 = $2PbO,\bar{A}$; eq. 275, mixed with a small proportion of acetate of lead.

Characters and tests.—Insipid. Sp. gr. 1·26 (1·066, *D.*). In other respects it answers to the tests above given (except the last) for acetate of lead.

Medicinal properties.—*Astringent and cooling.* It is only used externally.

Uses.—Goulard's Extract is not employed in its concentrated state; but, when diluted with water, it is used as a lotion in superficial inflammations, and as a *collyrium.* For this purpose it may be safely employed if there is *no ulceration* of the *cornea;* but if there is, it should be carefully avoided, for it is converted by the chloride of sodium in the lachrymal secretion into chloride of lead, which is nearly insoluble, and remains fixed in the ulcer. In simple inflammation of the conjunctiva, it may be safely used. It is used also as an injection for gonorrhœa; and, when combined with lard or simple cerate, it is applied as a dressing to irritable or suppurating sores.

Doses.—The proportions in which it is used can hardly be termed "doses." From five to ten minims, to an ounce of water; or four times this quantity to an ounce of lard, is the usual quantity.

Incompatibles.—All sulphates and carbonates. They decompose it, and form insoluble sulphate or carbonate of lead.

LIQUOR PLUMBI DIACETATIS DILUTUS, *L.D.*

DILUTED SOLUTION OF DIACETATE OF LEAD.

Synonyme. Liquor Plumbi Subacetatis compositus, *D.*

Take of Solution of diacetate of lead, a fluid drachm and a half (f℥ss, *D.*).
Distilled water, a pint.
Proof spirit, two fluid drachms (f℥ss, *D.*).
Mix.

Remarks.—The Dublin solution is nearly three times as strong as the London one.

Medicinal uses.—Employed as an application in superficial inflammation; as a collyrium; and as an injection in gonorrhœa and gleet. (See LIQ. PLUMBI DIACET. p. 538.).

PLUMBI CARBONAS, *D. E.*

CARBONATE OF LEAD. WHITE LEAD.

Preparations.—Various plans are adopted for making this substance; and the following (called the Dutch method) is only an outline of that most extensively employed in this country. Perforated plates of *cast* lead are laid one above another in an earthenware pot, the bottom of which is covered by a very small quantity of strong acetic acid, and the pot is then buried in a mixture of new and spent tan. In a short time the tan begins to ferment, giving rise to a considerable increase of temperature (150° or more), and to the abundant formation of carbonic acid. By the heat the acetic acid is volatilised, and, acting upon the lead plates, forms a layer of acetate of lead, which is decomposed by the carbonic acid, forming carbonate of lead, and setting the acetic acid free to form fresh acetate, to be again decomposed. In five or six weeks the process is complete; and the crust of carbonate, being broken off the plates, is ground along with water and afterwards dried, and then forms cakes easily reduced to an impalpable powder.

Composition.—Variable. It generally contains a portion of hydrated oxide of lead. If pure, it would contain

1 eq. oxide of lead, PbO, eq. 112; 1 eq. carbonic acid, CO^2, eq. $22 = PbO,CO^2$; eq. 134.

It is generally purposely adulterated with sulphate of baryta.

Characters and tests.—"It does not lose weight at a temperature of 212°. 66 grains are entirely dissolved in 150 minims of acetic acid, diluted with a fluid ounce of distilled water: and the solution is not entirely precipitated by a solution of 60 grains of phosphate of soda." *E.*

Its entire solubility proves the absence of most common adulterations: and if entirely dissolved by the prescribed quantity of acetic acid, chalk is not present, as it requires a much larger quantity for solution.

Medicinal properties and uses.—Carbonate of lead is never used internally: but when mixed with lard, it forms a cooling ointment. It is, however, the most frequent cause of poisoning by lead, owing to its extensive employment as a paint. Whilst grinding, it becomes diffused in fine powder through the room, and it is thus inhaled into the lungs: and the workmen introduce a further portion into the mouth, by neglecting to wash their hands previous to taking food.

PLUMBI NITRAS, *D. E.*

NITRATE OF LEAD.

Take of Litharge, four ounces and a half.
Diluted nitric acid, one pint.

Dissolve the litharge to saturation with the aid of a gentle heat; filter, and set the liquor aside to crystallise. Concentrate the residual liquid, to obtain more crystals.

Description and process.—The acid simply dissolves the litharge (*oxide of lead*), without any decomposition taking place, and forms a *solution*, which deposits small colourless crystals on cooling. They must be recognised by tests, if there is any doubt about their character. (*See* PLUMB. ACETAS, *Tests*, p. 536.)

Composition. — Nitrate of lead consists of

1 eq. *oxide of* lead, PbO, 112; 1 eq. nitric acid, NO^5, eq. 54 $=PbO,NO^5$; eq. 166.

Properties and uses.—It is only introduced into the D. and E. Pharmacopœias for the purpose of obtaining iodide of lead, but Dr. Ogier Ward has recently employed it with great advantage in *highly offensive discharges* from the uterus, and from sloughy *ulcers*. In an obstinate case of eruption on the scalp and face resembling rupia, it produced speedy improvement. "In short, as a lotion it is as extensively useful as the diacetate of lead, while it is superior to that preparation in its disinfecting property."

Dose.—The strength which Dr. Ward employed was about gr. xxv to ℥xvi of water; but as it is not in general use, he obtained it by dissolving the carbonate in dilute nitric acid. ℞. Plumb. Carb. ℈j; Acid. Nitr. Dil. *q. s.* ad solvendum; Aquæ ℔j.*

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* Ranking's Abs. vol. xv. p. 144.

PLUMBI IODIDUM, *L. D. E.*

IODIDE OF LEAD.

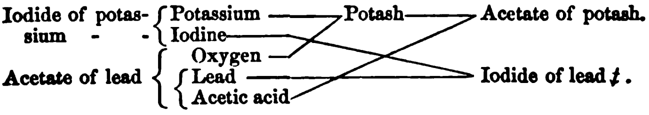
Take of Acetate of lead, eight ounces.
Iodide of potassium, seven ounces.
Distilled water, a gallon.

Dissolve the acetate in six pints of the water, and strain; and to these add the iodide, first dissolved in two pints of the water. Wash what is precipitated with cold distilled water, and dry it. Let it be preserved without access of light.

D. E. Take of nitrate of lead and iodide of potassium, of each, ℥j; Distilled water, Oij, *D.*; Ojss, *E.*

The directions are similar to the above in both the Dublin and Edinburgh Pharmacopœias; but after the precipitate has been washed, the Ph. Ed. adds, "Boil the powder in three gallons of water, acidulated with f℥iij of pyroligneous acid; let any undissolved matter subside, maintaining the temperature near the boiling point; and pour off the clear liquor, from which the iodide of lead will crystallise on cooling."

Process.—When solutions of iodide of potassium and acetate (or nitrate) of lead are mixed, both the salts are decomposed and iodide of lead is formed and precipitated, whilst acetate (or nitrate) of potash remains in solution. The changes do not consist of a simple transfer of the iodine and acid, but the oxygen from the oxide of lead combines with the potassium of the iodide, and forms potash, which combines with the acid and forms acetate (or nitrate) of potash, whilst the iodine of the iodide combines with the lead to form the iodide of lead.



The precipitate is to be washed with *cold* water, as the iodide of lead is soluble in *hot* water, and would therefore be washed away if this were employed. If the solutions are mixed whilst hot, some precipitate immediately falls, but some of the iodide of lead will remain dissolved, and be gradually deposited in beautiful yellow minute crystals, as the solution cools. As these are not so convenient for making ointment or pills as an amorphous powder, the solutions should be cold before they are mixed.

The Edinburgh College, assuming (*Christison*) that the iodide of potassium will contain a little carbonate of potash, which would form carbonate of lead, directs the whole precipitate, which, on this supposition, is a mixture of iodide and carbonate of lead, to be dissolved in boiling water, slightly acidulated. The water dissolves the iodide, and the acetic acid the carbonate, forming acetate of lead, which remains dissolved, while the pure iodide is again precipitated when the solution cools.

Properties. — Iodide of lead is a heavy powder, of a bright yellow colour. It is entirely soluble in boiling water, from which it is deposited on cooling, in minute, brilliant yellow crystals. It is very slightly soluble in cold water; but is soluble in solution of potash; in acetic acid, by the aid of heat; and in solution of iodide of potassium or acetate of lead. It is decomposed and partially volatilised by heat.

Characters and tests. — Powdered, yellow. It is dissolved by boiling water, from which, on cooling, it descends in shining yellow scales. It melts by heat, and is, in great part, dissipated in vapours, at first yellow, and afterwards violet. If sulphate of soda is added to 100 grains dissolved by a boiling heat in nitric acid diluted with twice its weight of water, after the iodine has been expelled, 66 grains of sulphate of lead are thrown down. Access of light should be excluded from it.

E. Five grains are entirely soluble at 212° in f℥j of pyroligneous acid, diluted with f℥jss of distilled water, and golden crystals are abundantly deposited on cooling.

The above tests indicate its character; and the weight of the precipitate in the Ph. L. proves the absence of adulteration.

Composition. — Iodide of lead consists of

1 eq. of iodine, 126; 1 eq. of lead, 104=PbI; eq. 230.

Compounds for which iodide of lead may be mistaken. — *Powdered ammonio-chloride of iron; hydrated binoxide of mercury* and *powdered mustard seeds.* It is distinguished from them all by the brightness of its colour, by its solubility in solution of potash, and by its solubility in boiling water, from which it separates in brilliant minute crystals on cooling.

Medicinal properties and uses. — Iodide of lead agrees in general properties with iodine and its compounds; and is used in the same cases in which they are employed, viz. *strumous* affections generally, but particularly *enlarged glands*, and *strumous disease of the joints.* Though highly spoken of by some systematic writers, it has always appeared to me to be the least efficient of this class of remedies; and this observation is confirmed by the experience of almost all practitioners with whom I have spoken on the subject.

Dose and administration. — Iodide of lead is employed both internally and externally; but chiefly the latter, in the form of ointment. The dose for internal administration is gr. iij or gr. iv. Dr. O'Shaughnessy gives it in doses of gr. x, in the form of pills.

PRÆPARATA E POTASSIO.

PREPARATIONS OF POTASSIUM.

Remarks upon the compounds of potassium generally.—Most of the compounds of this metal are soluble; but the bitartrate of potash and the double chloride of platinum and potassium are very sparingly so, and may easily be obtained as precipitates from any solution of a compound of potassium, which is not very dilute. Some of them are anhydrous, but others contain water of crystallisation. In the effects produced by exposure to the air there is a remarkable difference between them and the compounds of sodium. Many undergo no change on exposure. Some of them absorb water rapidly from the air, or *deliquesce*, but *none* of them lose their water or *effloresce*; whilst some of the salts of soda *effloresce*, but *none* of them *deliquesce*.* When *potash* is boiled with oil or fat it forms a *soft* soap, whilst *soda* under similar circumstances forms a *hard* soap. When tartaric acid is added in excess to any soluble compound of potassium it forms bitartrate of potash, which is but slightly soluble, and is thrown down as a white precipitate. This does not take place instantly, and during its formation a characteristic appearance may be produced by drawing the end of the stirring rod upon the bottom or sides of the precipitating jar, when fine white lines will be perceived along the parts passed over by the rod. A more delicate test than this is the bichloride of platinum, which causes a yellow precipitate when added to compounds of potassium. The colour imparted to flame by potash is characteristic and easily observed. The experiment is most advantageously performed in the following manner. The salt to be examined is to be dissolved in a *small* quantity of water. A few threads of cotton (wick) should be slightly covered with wax by drawing them lightly through the melted wax in a lighted taper, and should then be dipped into the solution. The moistened end of the cotton is then to be introduced for a moment into the *blue* part of the flame of a spirit lamp, which should be burning with a large flame. This instantly assumes a *violet* colour, and the difference may be rendered more perceptible by withdrawing the cotton and reintroducing it, and noticing the changes each time. Less than a quarter of a grain dissolved in a few drops of water is sufficient to show this character.

POTASSIUM. *Symb.* K (Kalium). Eq. 40.

This is the metallic basis of potash, and was first discovered by Sir H. Davy in 1807. It may be obtained in several ways.

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* Except the valerianate of soda, which is deliquescent.

thus to obtain the pure carbonate. It may also be prepared by heating crystals of bitartrate of potash in a covered crucible, and afterwards roasting what is left in an open vessel until it becomes white. The residue is then to be dissolved, and the solution evaporated to dryness. In the first part of this process the tartaric acid is decomposed, and carbon mixed with potash remains in the crucible. On exposing this to heat in an open vessel, the carbon is converted into carbonic acid, which forms carbonate of potash with the alkali. As obtained from this source, it is not, however, so pure as from the bicarbonate, but it is supposed to have the advantage of being cheaper. This is, however, a mistake, for whilst one pound of bitartrate of potash yields less than six ounces of carbonate, the same quantity of bicarbonate yields more than nine ounces and a half, which at the common market price makes the latter the cheaper method.

Properties.—Carbonate of potash is deliquescent, and soon attracts sufficient moisture from the air to become liquid. It is entirely soluble in less than its own weight of water, and owing to its great attraction for this fluid, it is crystallised with difficulty, and is generally in the state of amorphous colourless grains, obtained by stirring the fused salt until it becomes solid on cooling. It is quite insoluble in alcohol. It has an acrid, alkaline, disagreeable flavour, though not so nauseous as that of carbonate of soda; it reddens turmeric paper, and shows all the characters of an alkali; from which circumstance it was formerly called *sub*-carbonate of potash. It neutralises acids with the escape of carbonic acid gas. At a red heat it fuses and loses about 16 per cent. of water, but undergoes no other change.

Composition.—When solidified after being previously fused, it is anhydrous, and consists of

1 eq. potash, 48; 1 eq. carbonic acid, 22$=KO,CO^2$; eq. 70; or
1 eq. potassium, 40; 1 eq. carbatoxygen, CO^3,$=K,CO^3$; eq. 70,
forming carbatoxide of potassium.

Characters and tests.—It liquefies in the air. It is almost entirely dissolved by water; the solution changes the colour of turmeric to brown; when supersaturated by nitric acid, neither carbonate of soda nor chloride of barium throws down anything; nor does nitrate of silver, except very slightly. 100 grains of this salt lose 16 grains of water in a hot fire, and when afterwards added to dilute sulphuric acid it emits 26·3 grains of carbonic acid. It is to be kept in a well-stopped vessel.

E. It does *not* lose weight at a dull red heat.

The reason for this difference about the loss of weight is, that the Ph. Ed. directs the carbonate to be fused at a low red heat,

POTASSÆ CARBONAS (E LIXIVIO CINERE, *D.*), *L. D. E.*

CARBONATE OF POTASH (from lixiviated Wood Ashes).

Synonyme. Pearlash. Potassæ Subcarbonas. Sal Absinthii. Salt of Tartar. Salt of Wormwood.

The Dublin College is the only one which gives directions for preparing this substance. The London and Edinburgh Pharmacopœias placing it in the Materia Medica.

Take of Pearlash, ten pounds.
Distilled water, one gallon.

Pour the water on the pearlash, and macerate for a week, occasionally stirring the mixture. Filter through calico, and having evaporated the solution nearly to dryness, reduce the heat, and stir constantly with an iron rod, until granular crystals are obtained. Let these be immediately enclosed in well-stopped bottles.

Remarks. — Carbonate of potash is obtained from the ashes left by the combustion of land vegetables, as carbonate of soda is derived from those of *sea* plants. The ashes are lixiviated with lime, and the impure salt obtained by evaporating the solution to dryness, and, fusing the dried mass, is called *potash* or *potashes*, which is in large black lumps. When this is freely exposed in the air to the flame of a furnace, and stirred up with an iron rod, the combustible matters are consumed, and the mass acquires a bluish-white colour, and is termed *pearlash*, or impure carbonate of potash, which consists of the carbonate mixed with various saline and earthy impurities. The latter are removed by solution in *cold* water, as directed in the Dublin Pharmacopœia; and the residue, after evaporation, is carbonate mixed with variable quantities of sulphates and chlorides. The proportion of carbonate contained in any sample of potash or pearlash is estimated by the alkalimeter, in the manner described under the article CARBONATE OF SODA.

POTASSÆ CARBONAS PURUM, *L. D. E.*

PURE CARBONATE OF POTASH.

The London College does not specify by name that the salt is to be pure, but the tests which it gives imply that it is. The Dublin and Edinburgh Pharmacopœias give directions for obtaining it pure from the bitartrate or from the bicarbonate in the following manner: —

A pure carbonate of potash may be obtained by heating the bicarbonate to redness, by which the second equivalent of carbonic acid is driven off. In making the bicarbonate (see POTASSÆ BICARBONAS, p. 548.), all the impurities are separated, which enables us thus to obtain the pure carbonate. It may also be prepared by heating crystals of bitartrate of potash in a covered crucible, and afterwards roasting what is left in an open vessel until it becomes white. The residue is then to be dissolved, and the solution evaporated to dryness. In the first part of this process the tartaric acid is decomposed, and carbon mixed with potash remains in the crucible. On exposing this to heat in an open vessel, the carbon is converted into carbonic acid, which forms carbonate of potash with the alkali. As obtained from this source, it is not, however, so pure as from the bicarbonate, but it is supposed to have the advantage of being cheaper. This is, however, a mistake, for whilst one pound of bitartrate of potash yields less than six ounces of carbonate, the same quantity of bicarbonate yields more than nine ounces and a half, which at the common market price makes the latter the cheaper method.

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LIQUOR POTASSÆ CARBONATIS, *L.D.*

Solution of Carbonate of Potash.

Take of Carbonate of potash, twenty ounces (℥x, *D.*).
Distilled water, a pint.
Dissolve and strain. Sp. gr. 1·473 (1·31, *D.*).

Remarks.—This solution is nearly saturated, and is introduced as affording a convenient specific strength for employment in extemporaneous prescriptions. Its properties and uses are described in the preceding article.

The Dublin solution is just half the strength of the London one.

Dose.—♏x to fʒj.

POTASSÆ BICARBONAS, *L.D.E.*

Bicarbonate of Potash.

Process.—This salt can only be made profitably when prepared on a large scale, and the London College therefore places it in the Materia Medica. It is prepared by forcing carbonic acid into a solution of carbonate of potash under a considerable pressure, and the Ph. Dub. contains minute directions for conducting the process; but as the quantity obtained only amounts to a pound, they would not be followed in practice by the manufacturer. The Ph. Ed. gives directions for preparing it on a different plan, viz. triturating thoroughly together ℥vi of carbonate of potash, and ℥iijss of carbonate of ammonia, making them into a pulp with a little water, and drying them at a temperature not above 140°, until no odour of ammonia escapes. In this process the carbonate of ammonia gives up its carbonic acid to the carbonate of potash, and converts it thereby into bicarbonate, whilst it flies off itself as ammonia when heated to 140°. When the salt obtained by either of these methods is dissolved in water and the solution evaporated until crystals form, the sulphates, and chlorides present in the carbonate, and also a little silica, are either insoluble and are left undissolved, or else they are more soluble than the bicarbonate, and so remain in solution after its crystallisation. Hence the bicarbonate is pure, though the carbonate might contain several impurities.

Process.—When carbonic acid is passed through a solution of carbonate of potash, soda, or lime, it combines with the salt and forms a bicarbonate. In the case of potash and soda this is less soluble than the carbonate, and the newly-formed salt frequently by which it is rendered anhydrous, and the Ph. L. assumes that the salt has been crystallised from a watery solution; in which case it contains about 16 per cent. of water. The absence of effect from carbonate of soda proves the absence of lime; from chloride of barium, of sulphate of potash; and from nitrate of silver, of chloride of potassium.

Medicinal properties and uses. — *Antacid; antilithic; diuretic; liquefacient.* As a diuretic, carbonate of potash is much less efficient than the nitrate or acetate of potash, and is seldom used alone. As an antacid it is employed in *dyspepsia* dependent upon, or occasioning a too acid state of, the secretions; and in these cases it should generally be given in combination with some vegetable tonic. Care must be taken not to continue it so long as to occasion an alkaline state of the gastric secretions, which interferes even more with the digestive process than does an excess of acid. The same caution must be observed in its employment as an antilithic, and it must be remembered that this term is not synonymous with lithontriptic. It is only in cases where the urine is *acid*, and the calculus consists of lithic acid, that alkalies can be useful. If the urinary secretion is alkaline, they only aggravate the mischief, and sometimes even produce it, by being too long continued in cases in which their employment was at first beneficial. For these purposes the bicarbonate is, however, more frequently used than the carbonate, as it is equally efficacious, and the greater quantity of carbonic acid renders it less nauseous. As a *liquefacient* it is used to cause the absorption of various abnormal tumours, or to reduce glandular or lymphatic swellings. Thus it is employed in *bronchocele; enlarged liver* or *spleen;* and in *mesenteric disease;* but in these cases it is not so often employed as liquor potassæ. Combined with cochineal it is often given in the treatment of *hooping cough.* When applied externally it is a powerful *caustic*, and is capable of causing sloughing of the skin. In making some preparations, especially decoction of aloes, carbonate of potash is added in order to dissolve resinous or other principles insoluble in simple water; and it is also used to effect several chemical decompositions. Owing to the small quantity of carbonic acid, it is seldom employed for forming an effervescing draught. If taken for this purpose it ought not to be combined with tartaric acid, which forms an insoluble bitartrate; but with citric acid, or lemon juice. The proper quantities are here represented:

Carbonate of potash, ℈j; citric acid, gr. xvii, or lemon juice, fʒivss.

Dose. — The average dose is from gr. x to ℈j; but it is often given in doses of ʒss, repeated several times daily.

Incompatibles. — *Sulphate of magnesia*, with which it might be combined under the idea of uniting an aperient with an antacid. All the *soluble salts of iron*, except the potassio-tartrate, which might be added as tonics. *Red syrup*, when added as a colouring ingredient, is changed to a disagreeable, muddy-looking colour. Saffron or syrup of roses is the best colour for combination with the addition of tests

Medicinal properties and uses.—
as those of carbonate of potash,
carbonic acid renders the alkali le
suitable, especially when it is to b
cence with lemon juice or citric a
compatible with some substances w
compatible, as, for instance, sulphat
administered with bicarbonate of po
cipitate. (See POTAS. CARB. p. 54.)

Incompatibles.—The same as thos
the exception of sulphate of magnesia
combination with tartaric acid, as this
potash.

Dose.—Gr. x to ℈j. When given i
generally combined with citric acid.
tion required:

Bicarbonate of potash, ℈j; citric
juice, f℥iijss

POTASSÆ AQUA EFFE

EFFERVESCING POTAS

Take of Bicarbonate of potash, a dra
Distilled water, a pint.

Dissolve the salt in the water; and t
tion, carbonic acid gas under strong pr

Remarks.—The properti
cisely the

LIQUOR POTASSÆ, *L. D. E.*

SOLUTION OF POTASH.

Synonyme. Potassæ Aqua, *E.* Potassæ Causticæ Liquor, *D.*

Take of Carbonate of potash, fifteen ounces.
Lime (fresh burnt), eight ounces.
Distilled water, boiling, a gallon.

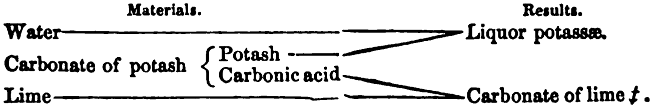
Dissolve the carbonate in half a gallon of the water. Sprinkle a little of the water upon the lime in an earthenware vessel, and the lime being slaked, add the rest of the water. The liquors being immediately mixed together in a close vessel, shake them frequently until they are cold. Then set by, that the carbonate of lime may subside. Lastly, keep the supernatant liquor, when poured off, in a well-stopped green glass bottle.

D. Pure carbonate of potash, ℔j ; Lime, ℥x ; Distilled water, cong. j and f℥vii.

E. Carbonate of potash (dry), ℥iv ; Lime, ℥ij ; Water, f℥xlv.

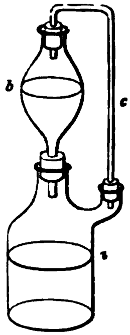
The directions in the Phs. Dub. and Ed. are different from the above, but so closely resemble each other that the following from the Ph. Dub. will suffice for both : "Slake the lime with f℥vii of the water ; dissolve the carbonate of potash in the remainder of the water, and having raised the solution to the boiling point in a clean iron vessel, gradually mix with it the slaked lime, and continue the ebullition for ten minutes, with constant stirring. Remove the vessel now from the fire, and when, by the subsidence of the insoluble matters, the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a green glass bottle furnished with an air-tight stopper."

Process.—When carbonate of potash in solution is brought into contact with slaked lime, it is decomposed, and parts with its carbonic acid to the lime, forming insoluble carbonate of lime, while potash remains in solution. This is an instance of ***single elective affinity***.



Liquor potassæ is nothing, therefore, but a solution of potash in distilled water. In making this solution care must be taken to exclude the air as much as possible during the process, and to add the solution of carbonate of potash to the lime as soon as it has been slaked. If these precautions are not attended to, the lime quickly absorbs carbonic acid from the air, and is rendered incapable of taking it from the carbonate of potash. The liquor potassæ, when formed, rapidly absorbs the same gas from the air, and is reconverted into the carbonate.

Solution of potash cannot be obtained of unlimited strength by this process, for Berzelius has observed that, unless diluted with about ten times its weight of water, it actually decomposes carbonate of lime, and takes the carbonic acid to itself. The Lond. Coll. does not order the solution to be filtered; but if this is not done, some portion of the solution remains in contact with the carbonate of lime, and is thereby lost.



In conducting the filtration, the annexed apparatus, invented by Mr. Donovon, is the most convenient, as it allows the process to be conducted as slowly as may be desirable, and at the same time prevents access of air, by which the potash might become recarbonated. It consists of two bottles, *a* and *b*, between which is a flexible tube, *c*. The lower end of *b* is funnel-shaped, and must be stopped with well-washed linen, through which the solution is to pass. This substance is employed, because potash or soda acts less upon it than upon paper. The solution is poured into *b*, and the apparatus is put together. Unless air could gain entrance into *b*, to supply the place of the solution as it passed through, the process of filtration would immediately cease; but by having the connecting tube *c*, the air, which was previously in *a*, enters *b* as the solution leaves it. In making the liquor potassæ, the process is more quickly conducted if the lime is added in successive portions to the solution of carbonate of potash, and boiled for a few minutes after each addition, as ordered in the Phs. Dub. and Ed.; as the decomposition is thereby more quickly and completely effected, and the carbonate of lime subsides more readily and perfectly; but as this plan is more troublesome and chiefly useful in saving time, the London College adheres to its old directions.

Properties.—Liquor potassæ is a limpid, colourless, odourless fluid, which possesses an acrid flavour, and feels soapy when rubbed upon the fingers, in consequence of partially dissolving the cuticle. It possesses the property of dissolving many animal tissues, and on this account, when applied to the skin, it acts as a caustic. It is highly alkaline, and neutralises the most powerful acids. It has a very strong affinity for carbonic acid, which, as already mentioned, it rapidly absorbs from the air. It gradually dissolves the oxide of lead contained in flint glass, and also a small portion of silica; hence the College orders it to be kept in a green glass bottle. The quantity of lead thus dissolved is very small, and unimportant in a medicinal point of view, though it might cause error if used in any delicate chemical investigation. Liquor potassæ, which I kept above three months in a common flint glass bottle, was coloured brown by sulphuretted hydrogen, but no precipitate was formed.

Composition.—Liquor potassæ is not a definite chemical compound, but consists of one part by weight of potash, in about sixteen parts of water. The Edinburgh solution is slightly stronger than that of London or Dublin.

Characters and tests.—Its sp. gr. is 1·063 (1·068, *D.*; 1·072, *E.*). 6·7 grains of potash are contained in 100 grains; nothing, or next to nothing, is thrown down from this solution on the addition of lime-water, or if it has been first saturated with nitric acid, by carbonate of soda, chloride of barium, or nitrate of silver. What is thrown down by bichloride of platinum is yellow.

Liquor potassæ is not liable to intentional adulteration, but, if exposed to the air after being once made, it rapidly absorbs carbonic acid, which is shown on the addition of lime-water, by the formation of a precipitate of carbonate of lime. If the carbonate of potash from which it has been prepared, has contained any sulphate or chloride, it would be shown by the barytes or the nitrate of silver; and if any salt of lime has been present in the carbonate of potash, it would be shown by the carbonate of soda producing a precipitate of carbonate of lime. The platinum test merely proves that potash is present.

Medicinal properties and uses.—These so strongly resemble what have been described under the head of carbonate of potash, that Christison considers it "extraordinary that it can be considered preferable to the carbonate;" but the experience of many physicians has persuaded them that in dyspepsia, attended with acid secretions and *considerable irritability* of the *gastric mucous membrane*, it is more efficacious. As a *liquefacient* or *resolvent* it is more frequently employed than the carbonates, for the removal of tumours. Sir B. Brodie speaks highly of its efficacy in removing fatty and other tumours, when used in large doses of ♏xxx to f℥j, three times a day, in a considerable quantity of any demulcent fluid. It is often employed with decided benefit in scrofula, and in secondary syphilis in strumous patients, for whom it is generally combined with infusion or decoction of sarsaparilla. Dr. Barlow has long used it at Guy's Hospital in the treatment of chronic *hydrocephalus*, which is generally dependent upon a strumous constitution, and he thinks that it produces more benefit in this intractable disease than any other remedy. It has been administered in very large doses with apparent temporary benefit in the treatment of *ovarian dropsy*, but the improvement has hitherto been only temporary. In *irritability* of the *bladder*, with acid urine, it is of much service when combined with laudanum. Dr. A. T. Thomson considers it almost a "specific in the various forms of psoriasis, which depend altogether upon acidity of the primæ viæ, and disordered assimilation."* It has been used with benefit in lepra and many inveterate skin diseases, in doses of ♏xv to ♏xxx, several times daily.

Incompatibles.—All the substances incompatible with carbonate of potash. It is often said that tincture of opium is incompatible; but however this may be, they are often given in conjunction with great benefit.

Dose and administration.—Liquor potassæ should be given in mixture with some mucilaginous or gelatinous fluid, and it is often taken in veal broth, milk, or beef tea. If taken in beer, some of it is expended in neutralising the free acid often contained in this beverage. In dyspepsia, it is very advantageously combined with rhubarb. Dr. Barlow's dose for infants and young children is one or two drops in some mucilaginous mixture. For adults, the dose is ♏x to ♏xxx. In psoriasis, fʒij must often be taken several times daily, and the same remark applies to ovarian dropsy and fatty or other tumours.

POTASSÆ HYDRAS, *L.D.E.*

Hydrate of Potash.

Synonyme. Potassa, *E.* Potassa Caustica, *D.* Lapis Infernalis. Potassa Fusa. Caustic Potash.

Take of Solution of potash, a gallon.

Evaporate the water in a clean iron vessel over the fire, until, the ebullition being finished, the hydrate of potash liquefies; pour this into proper moulds.

The Phs. Dub. and Ed. direct the solution of potash to be evaporated till it runs like oil, or until a portion of it, dropped upon a cold surface, solidifies. It is then to be poured out upon a bright iron or silver plate, and broken into pieces as soon as it is solid.

When prepared in this way we lose the convenience of the form which is directed by the Ph. L.

Process.—In this process the solution of potash is simply evaporated until all the water which can be driven off is expelled. During the evaporation, however, the potash becomes slightly contaminated with a little peroxide of iron, derived from the vessel. This is not of any consequence in a medicinal point of view. It is necessary that the evaporation should be carried on in an iron vessel, as potash acts upon both silver and platinum, when heated in contact with them, and this effect is more rapid, if they are at the same time freely exposed to air.† The Ph. Dub. orders either silver or iron to be used, neglecting this property of the potash.

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* Dispensatory.

† Faraday's Chem. Manipulations, 1st ed. p. 287.

Properties. — Hydrate of potash, if pure, is colourless, but it generally has a brownish or slightly blue tint, derived from the presence of a small quantity of oxide or sesquioxide of iron. It is hard, brittle, extremely deliquescent and caustic, soluble in rather more than its own weight of water, and entirely soluble in alcohol. It fuses at a low red heat, but even at this temperature it does not lose the whole of its water, but retains one equivalent (*Phillips*). It attracts carbonic acid rapidly from the air. During the evaporation, a portion of the potash is converted into peroxide of potassium; but it returns to the state of protoxide, with evolution of oxygen, on being dissolved in water. It is the escape of this gas which gives rise to the bubbles set free when hydrate of potash is dissolved in water. Hydrate of potash is poured whilst fused into moulds, which form it into round sticks about the size of a goose-quill.

Composition. — It consists of

1 eq. of potash, 48; 1 eq. of water, 9=KO,HO; eq. 57.

Characters and tests.—It quickly liquefies in an open vessel; it is dissolved in rectified spirit.

The Ph. Ed. merely gives tests to prove that it *is* impure. If pure, it would be soluble in spirit; but as it never is free from impurities, which, however, as a caustic, are of no practical consequence whatever, it never is entirely dissolved by it.

Substance for which it may be mistaken. — From its form, being the same as that in which nitrate of silver is usually seen, it may be mistaken for that salt, but it is immediately distinguished by the effect of tests. When exposed to the air for a short time, its surface becomes moist, whilst that of the silver salt remains dry. When potash is dissolved in water, the solution reddens turmeric paper and tastes alkaline, but nitrate of silver produces neither of these effects.

Medicinal properties. — Hydrate of potash is never used internally. When applied externally it acts as a violent caustic, decomposing the tissues, destroying their vitality, and forming a deep slough. It seems to produce this effect in consequence of its powerful affinity for water, which it abstracts from the tissues, without which they cannot maintain their life or characters. It acts quickly and with certainty, and no other substance is so frequently used for this purpose. Its application causes acute pain, which sometimes continues for many hours after the removal of the caustic, on which account nitric acid is preferable in many cases, as it causes less pain. (See NITRIC ACID, *Effects and Uses*, p. 98.) There are two methods of using caustic potash, the first of which causes more severe pain at the time, though it sooner subsides; whilst the second acts less quickly, and occasions less acute suffering, but it continues so much longer, that the first plan is generally to be preferred.

1st Method. A stick of the caustic is held in a quill or piece of paper, and, when slightly moistened, is rubbed upon the skin until it changes colour, and assumes a dead white appearance, which generally happens in from three to five minutes; the slough thus formed is to be treated in the usual way. The deliquescence of the potash causes it sometimes to spread beyond the prescribed limit, and thus makes a larger slough than is intended; but this is not so liable to happen when it is used in this manner as when employed in the

2nd Method. This ought, perhaps, to be described under the next article (potassa cum calce), but it seems to come more naturally in this place. In this method a hole is cut in two or three thicknesses of adhesive plaster, rather smaller than the intended issue. Potash, or better still, the potassa cum calce, is to be moistened with spirit or water and spread upon a piece of adhesive plaster, or upon the skin, so as to cover the intended place, and is then retained in its position by means of a bandage. In two or three hours a slough is formed, and the caustic may be removed, and a poultice applied as before, after the skin has been first washed with vinegar to remove any adhering potash.

It is to be remarked, that patients on whom both potash and the actual cautery (see FERRUM, *Uses*, p. 447.) have been used, generally prefer the latter as occasioning less pain upon the whole, though it is more severe for a short time. An issue is always *much* larger than the slough at first formed by caustic, but is smaller than one caused by the actual cautery.

Uses.— The uses of issues are numerous. *Ulceration of cartilages* is more efficiently treated by issues, than by repeated blisters; and it is better to reapply the potash, when the ulcer is beginning to heal, than to have much trouble in keeping it open by peas.* *Varicose veins* are sometimes obliterated by means of an issue. Previous to the separation of a slough, inflammation is set up in the neighbouring parts, and adhesive matter is poured out. A slough is, therefore, formed over the vein, which becomes obliterated by this adhesive process, and prevents any hæmorrhage on the separation of the slough. On the same principle it has been proposed to open fluctuating *abscesses in the liver*, through the abdominal parietes. The opposite layers of the peritoneum will adhere, and the pus be prevented from escaping into the general peritoneal cavity. *Scrofulous* and *venereal abscesses*, when large, and confined by a thin, dusky, unhealthy skin, are sometimes advantageously opened by means of potash, which destroys the unsound skin, and thereby favours the healing of the abscess. *Nævi*, when large and superficial, are sometimes cured by the formation of a superficial slough; the ulceration caused by which spreads and ultimately destroys the morbid tissue. *Venereal warts* are often destroyed by caustic potash. *Chronic gastritis* is frequently materially benefited by an issue upon the epigastrium, and other chronic diseases are similarly treated. Dr. Graves says, that in the treatment of *porrigo* on the scalp, when of long standing, an issue in the arm ought never to be omitted; it contributes to the cure, and he has known serious head affections result from the suppression of the discharge, when this precaution had been neglected.* *Stricture of the urethra* has been treated by means of caustic, but the practice is so dangerous and uncertain, that few surgeons now adopt it.

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* Brodie on Diseases of the Joints.

Officinal preparation. — Potassa cum Calce.

POTASSA (CAUSTICA, *D.*) CUM CALCE, *L. D. E.*

POTASH WITH LIME.

Synonyme. Vienna Paste.

Take of Hydrate of potash,
Lime (quick), of each, an ounce.

Rub them together, and keep them in a well-stopped vessel.

E. Evaporate any convenient quantity of aqua potassæ to one-third of its volume; add slaked lime till the fluid has the consistence of firm pulp; preserve the product in carefully covered vessels.

Characters and tests.—When slaked by water being poured upon it, it emits no bubbles of carbonic acid when any acid is added.

Properties and uses.— When applied to the skin it produces a slough in two or three hours. (See POTASSÆ HYDRAS, *Uses*, p. 556.)

POTASSÆ ACETAS, *L. D. E.*

ACETATE OF POTASH.

Synonyme. Sal Diureticus. Kali Acetatum.

Take of Acetic acid, twenty-six fluid ounces.
Carbonate of potash, a pound, or as much as is sufficient.
Distilled water, twelve fluid ounces.

Add the carbonate gradually to the acid mixed with the water, to saturation; then strain. Evaporate the liquor in a sand-bath, the heat being cautiously applied, until the salt is dried.

D. Saturate the acid, &c. as above; "add a few drops of acetic acid that the solution may be slightly acid, and having evaporated to dryness, melt the residue by the cautious application of heat, in a clean pot of cast iron. The liquefied salt is now to be removed from the fire, and when, upon cooling, it has solidified, it should be quickly broken into fragments of a suitable size, and enclosed in a bottle furnished with an air-tight stopper.

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* MS. Clin. Lectures.

Process. — When acetic acid is added to carbonate of potash it combines with the potash, forming acetate of potash, and the carbonic acid escapes with effervescence.

Properties. — Acetate of potash, as usually prepared, has a striated or foliated, but not a crystalline appearance. It is very deliquescent, and on this account cannot be crystallised by slow evaporation. This process is therefore conducted quickly, and when the salt becomes dry the temperature is slightly raised, and the mass fused, and as it cools it assumes the appearance described. If the temperature is not carefully attended to, the acetic acid is liable to be decomposed, and charcoal and carbonic acid formed. Acetate of potash has a sharp saline taste, is soluble in little more than its own weight of water, and in twice its weight of alcohol. The solution often has an alkaline effect upon turmeric paper, owing to a very slight excess of carbonate of potash, which can scarcely be prevented.

Composition. — Acetate of potash is an anhydrous salt, and consists of

1 eq. of potash, 48; 1 eq. of acetic acid, $51 = KO,\bar{A}$; eq. 99.

Characters and tests. — It is dissolved in rectified spirit and in water. The watery solution neither changes the colour of litmus nor turmeric; nothing is thrown down from it on the addition of chloride of barium or nitrate of silver; but if any thing is thrown down by nitrate of silver from a strong solution, it is again dissolved on the addition of water or by dilute nitric acid. Sulphuric acid being added, elicits acetous odours. From 100 grains of this salt, digested in sulphuric acid, 88·8 grains of sulphate of potash remain when the solution is evaporated, and the salt dried by a hot fire.

Acetate of potash is not liable to fraudulent adulteration, but it generally contains a *slight* excess of carbonate of potash, and does change the colour of turmeric. It may contain sulphate or chloride of potassium from an impure carbonate having been used. If the solution is strong to which nitrate of silver is added, acetate of silver is formed, which, being but slightly soluble, is precipitated, but is redissolved on the addition of more water, or of nitric acid, by which it is distinguished from chloride of silver, which is perfectly insoluble in either. The weight of sulphate of potash formed proves the absence of water in excess, and of other impurities.

Medicinal properties and uses. — In small doses, acetate of potash is an efficient *diuretic;* in larger ones, *purgative*, sometimes causing griping. It is a valuable remedy in most cases of *dropsy*, as it acts upon both the kidneys and the bowels. It is sometimes used as an *alterative*, in *obstructions* of the *liver*. It should be *copiously* diluted when given as a diuretic.* In its passage through the stomach it is decomposed, and produces an alkaline effect upon the urine. It should therefore be avoided where there is a phosphatic diathesis.

Dr. Golding Bird has lately called the attention of the profession very strongly to the "depurative effects" of acetate of potash, to which he attributes medicinal powers beyond what have usually been imputed to this salt. He urges the fact that it not only increases the quantity of urine excreted by the kidneys, but also the *amount of solid materials* contained in it. This solid matter is derived from the transformation of the animal tissues into such a form of matter as is capable of being removed by the kidneys,— the grand organs for removing from the system such substances as are dissolved in the blood, but are not necessary or fit for the repair of the structure of the body. The acetic acid being one which undergoes change in the system with great facility, he has used it extensively in cases in which there appears to be a *materies morbi* in the body, which requires elimination, and rheumatism is one of them; the disordered condition of the urine and of the other secretions, and other circumstances connected with the disease, being the indications of this *materies morbi.*

In illustration of these views, and of its practical efficacy in the treatment of *acute rheumatism*, he has recorded some cases, of which the following are representatives. A girl, æt. 16; ill several days; general febrile symptoms; all the large joints swollen, stiff, and painful, and grating on being moved. Ordered acetate of potash, gr. xxv every four hours, and Dover's powder at night. On the 3rd day fever abated; joints easily moved and without pain; 14th day, well except weakness. Second case, woman, æt. 29; ill five days; several large joints exquisitely tender and swollen; general fever and no sleep for several nights. Ordered acet. pot. ʒss every four hours. Dover's powder at night; 3rd day easier; then gradual steady improvement till the 16th, when she was well, except some slight remaining stiffness and weakness. (For fuller details on this subject, see Bird on Urinary Deposits, 4th ed. ch. xiv. Lancet, Feb. 15, 1851, p. 177.)

Ague is another disease in which he considers it to exert a peculiarly beneficial influence. It frequently happens that persons suffer from the effects of malaria without, however, ever experiencing a decided fit of ague; but the general health is impaired, the skin is sallow, and the secretions are disordered, as in ordinary cases of the disease. So also it is not uncommon for the violence of the attacks to be cut short by quinine, and yet the health and natural appearance are not restored. In such cases a slight circumstance will sometimes cause a return of the paroxysms, or if not the health still suffers from what is called "dumb ague." Now in these cases it is that the acetate of potash is so efficacious, according to his experience; and he gives cases which show the influence that half-drachm doses, three or four times a day, produced in removing the morbid symptoms, restoring a healthy hue to the skin, and even in putting a stop to paroxysms of the disease.

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* See remarks prefixed to the list of diuretics in the "Classification of Remedies."

The influence of this remedy in reducing the tissues into a form capable of removal by the kidneys, is such, that a patient was reduced even to a state of emaciation by the free employment of the acetates, but as soon as the remedy was discontinued he regained his flesh. Mr. Hilton, of Guy's Hospital, has employed it in *gonorrhœa* and *gleet*, and has reported cases in which the disease was removed without the employment of any other remedy.* The reported cases are, however, too few at present to enable us to form a decided opinion upon its value in these diseases. Mr. Hilton's cases present no striking results in the rapidity of relief obtained, or in the permanency of the cure effected. The dose was ʒss, three or four times a day.

Characteristics as a diuretic.— Efficient; acts sometimes upon the bowels; has an alkaline effect upon the urine; does not lower the pulse, like digitalis, nor act upon the bronchial mucous membrane, as an expectorant, like squill.

Dose.— As a *diuretic*, ℈j to ʒss; as a *purgative*, ʒj to ʒiij.

Incompatibles.— The mineral acids; as they decompose it and evolve acetic acid.

POTASSÆ CHLORAS, *L.*

CHLORATE OF POTASH.

Synonyme. Oxymuriate of Potash.

Process. — Chlorate of potash is introduced into the Materia Medica, and, therefore, no directions are given by the College for its preparation. It is frequently made by passing chlorine through a solution of potash, when the following changes occur. Six equivalents of potash are acted upon by six equivalents of chlorine, and five of them are decomposed. The five equivalents of potassium combine with five equivalents of chlorine, and form five equivalents of *chloride of potassium*; whilst the five equivalents of oxygen separated from them combine with the sixth equivalent of chlorine and form one equivalent of *chloric acid*, which combines with the sixth equivalent of potash and forms one equivalent of *chlorate of potash*. Both these salts are soluble, and there remains, therefore, in the solution a mixture of

1 eq. of chlorate of potash, and 5 eqs. of chloride of potassium

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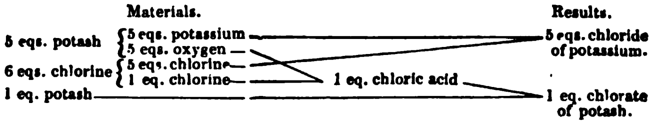
* Braith. Retr. vol. xxii. p. 332.



Chlorate of potash is not so soluble as chloride of potassium, and on evaporating the solution it crystallises, whilst the chloride remains dissolved.

Properties.— Chlorate of potash is generally in small colourless crystals, which appear to be made up of a number of smaller ones, fitted one within the other. The *primary* form is an *oblique rhombic prism* (*Brooke*). It is soluble in 16 times its weight of cold water, and in 2½ times its weight of boiling water. It is not affected by the air, being neither deliquescent nor efflorescent. When heated to a temperature above 660° F. (*Turner*), it is decomposed, and converted into chloride of potassium, the whole of the oxygen combined with both the acid and base being given off. This effect is much facilitated, by mixing the salt with about a sixth of its weight of binoxide of manganese, previous to the application of the heat; by which means a far lower temperature is sufficient, and the gas escapes with much greater rapidity.

When chlorate of potash is placed in contact with a combustible body such as oil of turpentine, or sugar, and phosphorus, and is moistened with a drop of sulphuric acid, it is suddenly decomposed, with the evolution of so much heat, that the mixture takes fire, with slight explosion. Chlorate of potash does not produce a precipitate when added to a dilute solution of nitrate of silver, if it is perfectly free from chloride of potassium.

Composition.— Chlorate of potash is anhydrous, and consists of

1 eq. potash, 48; 1 eq. chloric acid, 76=KO,ClO^5; eq. 124.

Salt for which it may be mistaken.— Bicarbonate of potash. It may be distinguished by the absence of effervescence on the addition of an acid; and by the effect produced on the addition of sulphuric acid, oil of turpentine, and phosphorus, as mentioned above. It may be distinguished from iodate of potash by exposing it to a high temperature, and dissolving the remaining salt. If it were iodate of potash, it will have been converted into iodide of potassium, which will cause a red precipitate in a solution of bichloride of mercury. No precipitate is formed if the salt were originally chlorate of potash.

Characters and tests.—It is dissolved in water; the solution throws down nothing on the addition of nitrate of silver. It melts by heat, and gives off nearly 39 grains of oxygen from 100 at a red heat. A few minims of sulphuric acid being dropped upon the crystals, the salt becomes yellow, next red, and exhales yellow

fumes of peroxide of chlorine. It crackles when rubbed (quickly) with sulphur.

The only probable impurity is chloride of potassium, from imperfect separation by crystallisation. This is provided against by the nitrate of the silver, which produces no effect upon chlorate of potash, but does upon chloride of potassium. The other tests merely prove the nature of the salt.

Medicinal properties and uses. — Chlorate of potash was at one time used in phthysis and syphilis, on the hypothetical supposition that it might furnish oxygen to the system. It has also been used in Asiatic cholera, but the results of experience have not established its value. It has been used in typhus fever, when the skin is dusky, owing to the imperfect arterialisation of the blood; but its good effects have not been so decided as to induce confidence, and it is now seldom employed in either this or any other disease. Neligan speaks of its employment in *cancrum oris*, or phagedenic ulceration of the cheek in children, and says, "in this affection it proves singularly beneficial." Some cases in confirmation of this statement are contained in Guy's Hosp. Rep., vol. vii. p. 331. Dose gr. x ter in die. It is proper to add that the parts were freely touched with solution of nitrate of silver at the same time. Its employment in the severest forms of *scarlatina* has been highly spoken of by Dr. Watson and Messrs. Taynton and Williams. "℥ij of potas. chloras are to be dissolved in f℥ij of hydrochloric acid previously diluted with f℥ij of distilled water; the solution to be kept in a dark place. Of this solution fʒij are to be mixed with a pint of water, and a tablespoonful or two may be taken frequently." Dr. Watson says, "My informants have stated that whereas they formerly dreaded to be summoned to cases of that disease, they now, having had experience of the virtues of chlorine *, felt no misgivings in undertaking its treatment." It is an important and valuable source for furnishing oxygen to the chemist.

Dose and administration. — It has been given in doses of gr. x to ʒss.

POTASSÆ NITRAS, *L.D.E.*

NITRATE OF POTASH.

Synonyme. Nitre. Saltpetre. Sal Prunella.

Preparation. — This is another salt which is included in the Materia Medica, being found naturally in large quantities in many parts of the world. In the East Indies it effloresces upon the ground in great abundance; and it is also found in Ceylon, and in great plenty in Eastern Africa. It is manufactured in France and Sweden by a process similar to that by which it is naturally formed in the soil of other places. Decayed leaves, animal refuse, blood, offal, &c., old mortar, feldspar, and earth, are mixed together in variable proportions, to form a *nitre bed*, which is protected from the weather by a roof. This bed is moistened from time to time with stale urine, and turned up so as to be thoroughly exposed to the air. In the course of two or three years the process is complete, and the bed is then lixiviated to obtain the soluble portions. These consist essentially of nitrate of lime and a little nitrate of potash, and sulphates and hydrochlorates. The solution is filtered through wood ashes, which contain carbonate of potash. Double decomposition ensues, and nitrate of potash passes through, whilst carbonate of lime remains on the filter. The impure nitre thus obtained is purified by repeated solutions and evaporations. The source of the nitric acid is still a matter of doubt. It is usually attributed to the combination of the nitrogen of the animal matters with oxygen from the air; but as this salt is formed in some places without the presence of animal matters, these cannot be essential to its production. Liebig imagines it to be derived from the oxidation of the ammonia, always present in the air, giving rise to nitric acid and water. This view is supported by the fact that stale urine is advantageously employed to moisten the nitre beds, which is an abundant source of ammonia. When purified saltpetre is fused and run into moulds, it forms the opaque white balls, known as sal prunella.

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* Braith. Retros. vol. vi. p. 46.

Properties. — Nitrate of potash forms white, striated, opaque crystals, having generally a six-sided lengthened figure, but so much broken as to render it often difficult to trace the form. The *primary form* is a *right rhombic prism*. It is soluble in four times its weight of water at 60° F., and much cold is produced during the solution. It is soluble in less than its own weight of boiling water. It is decomposed by a red heat, and gives off oxygen, which may be readily and copiously obtained from this source. If the heat is continued too long, nitrogen comes off, mixed with it. It deflagrates when thrown upon hot coals, and causes brilliant combustion.

Composition. — Nitrate of potash is an anhydrous salt, but generally contains some water mechanically combined with the crystals. It consists of

1 eq. potash, 48; 1 eq. nitric acid, $54 = KO, NO^5$; eq. 102.

Salt for which it may be mistaken. — It is not likely to be mistaken for any other salt.

Characters and tests. — It is dissolved by water; from this solution nothing is thrown down by chloride of barium or nitrate of silver. It melts by heat, but loses no weight: it gives up oxygen in a hot fire; from the remaining salt, rubbed to powder, sulphuric acid elicits nitrous vapours. Thrown upon burning charcoal, it deflagrates, carbonate of potash being

left. From 100 grains, digested in sulphuric acid, 86 grains of dried sulphate of potash are obtained by a red heat.

The most probable impurities are chloride of potassium and sulphate of potash, which are indicated by the chloride of barium and nitrate of silver. The other tests merely indicate the nature of the salt.

Medicinal properties.—*Refrigerant; sedative; diuretic.* Saltpetre lowers the pulse, diminishes the heat of the skin, and causes an increased secretion of urine. In very large doses it sometimes disorders the stomach, but it may be safely given in much larger quantities than are generally necessary, or than are usually employed. It does not cause so much permanent depression as some other sedatives, such as tartar-emetic. It has, however, occasioned death in one or two instances, when taken to the amount of an ounce in a *small* quantity of water; which has happened in consequence of its being mistaken for Epsom salts. When taken in a *large* quantity of fluid, this dose, often repeated, does not produce bad effects.* Though medical practitioners generally consider this salt to possess the properties above stated, Dr. Christison doubts its value in almost all these respects, and thinks it the least efficient of the remedies possessing similar properties. When dissolving in water, it causes a great degree of cold, and is often used for this purpose in fever or strangulated hernia. A bladder, containing four ounces of this salt, and an equal weight of powdered sal ammoniac, and one or two pints of water, is laid upon the scalp or upon the hernia.

Uses.—In *fever*, as a refrigerant and sedative of the heart's action. It should always be given in a considerable quantity of water. *Acute gonorrhœa;* it has long been a favourite remedy for abating the scalding of this disease, and should be taken freely, in a *large* quantity of barley water or solution of gum acacia. *Dropsies;* it is thought to act most beneficially in ascites, but there is much doubt as to its real value in this class of disease. In *hæmoptysis* it is often useful. It has lately been proposed in *acute rheumatism*, and remarkably good effects have been attributed to it. It is chiefly in France that it has been used in this disease. M. Gendrin and Dr. Henry Bennett recommend its employment in doses amounting to ℥ss in the day, to begin with, to be increased to ʒxii daily, given in a *large* quantity of barley water. Thus employed, it does not cause renal disease or mucous irritation; though it does, if but *little* fluid is given. In these doses it lowers the pulse, promotes all the secretions, and the disease abates and entirely subsides in a few days. The cases in which it has been thus tried were in the Hôpital de la Pitié, in Paris. These good effects are, however, denied *intoto* by Dr. Monneret, and much discredited by Dr. Todd.* I have often seen it give relief in the *dyspnœa* occasioned by *emphysema* in persons who are habitually asthmatic; but it is of no use in an attack of spasmodic asthma. It is said to have proved useful when given in small doses in *incontinence of urine*, but my own experience, on extensive trial, has not confirmed this statement. It has been used successfully in *scurvy* when other remedies could not be obtained, in doses of one drachm dissolved in an ounce of vinegar, from three to eight times a day. (Copland's *Dict.* art. *Scurvy*, p. 783.)

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* Braithwaite's Retrospect, vol. ix. p. 26

Antidotes. — In accidental poisoning by an over dose of this salt, opium and some aromatic must be given. There is no chemical antidote.

Incompatibles. — It may be prescribed with anything except a large excess of tartaric acid.

Doses and administration.— The average dose is gr. viij or gr. x for an adult; but, in acute gonorrhœa and acute rheumatism, it is given to the amount of several drachms daily. When used in large doses it should be dissolved in much fluid. If intended for the local application of cold, three or four ounces, powdered, should be put into one or two pints of cold water, contained in a bladder.

POTASSÆ SULPHAS, *L. D. E.*

Sulphate of Potash.

Synonyme. Sal Polychrest.

This salt is now placed in the Materia Medica by the London College. The following directions are given by the Phs. Dub. and Ed. :—

Take of the Salt left after the distillation of nitric acid, two pounds.
White marble (*E.*), fresh slaked lime (*D.*), sufficient.
Boiling water, two gallons.

Dissolve the salt in the water, and add the marble (or lime) till effervescence ceases, and the solution is neutral to litmus paper. Filter; and evaporate till a pellicle forms on the surface; then set aside to cool and form crystals.

The Dublin Ph. desires a very small quantity of carbonate of potash to be added previous to evaporation, and the liquid to be again filtered, and then neutralised by dilute sulphuric acid, after which it is to be evaporated.

Process. —It has been mentioned, when speaking of nitric acid, that the salt which remains after the distillation of the acid is bisulphate of potash. The second equivalent of sulphuric acid is, in this process, neutralised by the marble or lime, which forms sulphate of lime, and is precipitated.

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* Braithwaite's Retrospect, vol. ix. pp. 29. 64. 79.

Properties. — Sulphate of potash occurs in small colourless crystals, which have a very characteristic form. The *primary* form is a *right rhombic prism* (Phillips), a *rhombic octahedron* (Mitscherlich), but the *usual* form and size are represented in *fig.* 1.

Fig. 1.

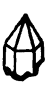


Fig. 2.

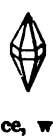
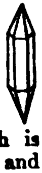


Fig. 3.



The crystals have a remarkably pointed appearance, which is caused by the six sides meeting in a point at the apex, and forming a six-sided pyramid. The base is generally broken, but it sometimes appears as if the crystal has consisted of two pyramids, joined base to base, as in *figs.* 2 and 3. The sharp apex is occasionally absent, and the crystal terminates in a flat plain, bounded by six sides. Even when the six sides cannot be distinctly made out, the crystal has a sharp-pointed character, which is generally sufficient to distinguish it from others. Two or more crystals are not unfrequently united by their bases, so as to form a compound crystal. They are soluble in fifteen parts of cold, and in five parts of boiling water, but are insoluble in alcohol. They are so hard that the edges are not quickly rubbed down; friction alters their form much less than that of most other salts, which property is made use of for the division of other bodies, and this salt is an ingredient in Dover's powder in order to render the division of the ipecacuanha and opium more perfect. Sulphate of potash has a slightly bitter taste.

Composition. — Sulphate of potash is anhydrous, and consists of 1 eq. potash, 48, and 1 eq. sulphuric acid, 49=KO,SO^3; eq. 97; or, 1 eq. potassium, 40, and 1 eq. sulphatoxygen, 57=K,SO^4; eq. 97.

Characters and tests. — It is slightly soluble in water; what is thrown down from this solution by bichloride of platinum is yellow; and by chloride of barium, white, and insoluble in nitric acid. It crepitates by heat; it melts at a red heat, but loses no weight. From 100 grains, dissolved in distilled water, chloride of barium and hydrochloric acid being added, 132 grains of sulphate of barytes are obtained when dried at a red heat.

Sulphate of potash is not liable to fraudulent adulteration. A few years since, arsenious acid was often present accidentally, owing to its presence in the sulphur from which sulphuric acid was made. It would be detected by a yellow precipitate being formed by hydrosulphuric acid.

Salts for which it may be mistaken. — Its form is so characteristic that it can scarcely be mistaken for any other salt.

Medicinal properties.—Mild laxative. It does not occasion heat or pain. Some cases have been reported lately in which doses of three to six drachms, given to women recently delivered, have been followed by a fatal result; but this is so contrary to usual experience, that it is not sufficient to forbid the employment of the salt as a laxative.

Uses.—"It is employed with great advantage in removing the visceral obstructions of children; and when combined with aloes or rhubarb, I have found it more useful in jaundice and dyspeptic complaints than the other saline purgatives" (*A. T. Thomson*). In diarrhœa, and hepatic and hæmorrhoidal affections, it is commended by other writers.

Characteristics as a purgative.—Mild; not offensive in taste; not easily soluble; acts upon the liver, and removes viscera obstructions, especially in children.

Dose and administration.—Owing to its sparing solubility, it is generally given in the form of powder, combined with rhubarb or aloes. The dose, as a *deobstruent*, in visceral affections, is gr. x or gr. xv. As a purgative, ʒj to ʒiv.

Incompatibles.—The only incompatible substance with which it is likely to be combined is tartaric acid, which forms the insoluble bitartrate of potash.

Officinal preparations.—Pulvis Ipecacuanhæ comp.

POTASSÆ BISULPHAS, *D. E.*

Bisulphate of Potash.

Synonyme. Sal Enixum.

E. Take of the residuum in the preparation of pure nitric acid, two pounds.
Sulphuric acid, seven fluid ounces and one fluid drachm.
Boiling water, six pints.

Dissolve the salt in the water, add the acid, concentrate the solution, and set it aside to cool and form crystals.

The Dublin Ph. directs a second eq. of acid to be added to sulphate of potash; but the preparation of the sulphate at first, and then its reconversion into bisulphate, increases the expense so much, that the plan is not likely to be followed in practice.

Process.—The salt which remains after the distillation of nitric acid is bisulphate of potash. When this is dissolved in water, and the solution is allowed to crystallise, it occasionally happens that some of the sulphuric acid is divided between the water and the potash, and some sulphate and sesquisulphate of potash are therefore mixed with the bisulphate (*Phillips*). In order to prevent this, an additional quantity of sulphuric acid is added previous to the evaporation of the solution.

Properties.—Bisulphate of potash is colourless, very acid, and bitter, and much more soluble in water than the sulphate, requiring only twice its weight at 60° F. The solution reddens litmus paper, and decomposes carbonated salts with effervescence. By a red heat the water of crystallisation and the second equivalent of acid are driven off, and sulphate of potash remains. The crystals are usually very small and flattened, and it is difficult to trace any distinct figure. The *primary form* is a *right rhombic prism.*

Composition.—Crystallised bisulphate of potash consists of

1 eq. potash, 48 ; 2 eqs. sulphuric acid, 80 ; 2 eqs. water, 18 $=KO,2SO^3,2HO$; eq. 146.

Tests and adulterations. — It is not liable to adulteration.

Salts for which bisulphate of potash may be mistaken.—It is sometimes difficult to distinguish it by the mere appearance from crystals of potassio-tartrate of antimony. They may be at once distinguished by the acid taste of the bisulphate of potash, and by its action upon litmus paper. Hydrosulphuric acid occasions an orange-red precipitate in a solution of the antimonial salt, but produces no such effect upon the bisulphate of potash.

Medicinal properties and uses. — Bisulphate of potash is very seldom used in medicine, but is supposed to combine the effects of sulphuric acid with those of a saline aperient. Dr. Paris says that it covers the taste of rhubarb. It may be used in the same cases as sulphate of potash. It is sometimes employed as a cheap acid for effervescing draughts.

Dose.—Gr. x to ʒij.

Incompatibles. — The carbonated alkalies; unless it is added to them in order to produce effervescence.

POTASSÆ BICHROMAS, *D.*

BICHROMATE OF POTASH.

This salt is obtained by heating native chromite of iron to redness with nitrate of potash. The nitric acid gives up oxygen to the chromous acid, and converts it into chromic acid, which combines with the potash of the saltpetre and forms chromate of potash, whilst the iron remains in the form of peroxide of iron. The chromate is then separated by solution in water, and nitric, sulphuric, or acetic acid is mixed with it, which takes away half the potash, leaving the remainder combined with a double quantity of chromic acid, and constituting bichromate of potash.

Characters. — This salt is in brilliant red crystals, which are so characteristic in their appearance, that when once seen they are not liable to be mistaken.

Composition :—

1 eq. potash, 48 ; 2 eqs. chromic acid, $104=KO,2CrO^3$; eq. 152.

Medicinal properties. — Bichromate of potash possesses very powerful irritant properties, but it has not hitherto been much used as a medicine, and cases of poisoning by it are rare, although they have occurred. A man was found dead in bed, having taken this salt; and his death was attributed to it. A boy also, who took a dose (quantity not mentioned), had pain, vomiting, dilated pupils, cramps in the legs, and insensibility, and only recovered after a lapse of four months.*

Uses.—Bichromate of potash is chiefly used in calico printing, for bleaching palm oil, and for yielding oxygen when heated with about its own weight of sulphuric acid. It is introduced into the Pharmacopœia to supply oxygen in the process for making valerianate of soda, which see. It has lately been used by Dr. Vicenti of Paris, as a substitute for mercury in secondary syphilis, and it is said "with much success;" but from the report it appears that the remedy was taken for three months, and the patient "was then quite well of a very intense attack of iritis, accompanied by other syphilitic symptoms, which had almost blinded him."† But recovery from syphilitic iritis is no great proof of the efficacy of a medicine, which has been three months in effecting the cure.

Dose.—Vicenti gave gr. ⅛ night and morning.

POTASSÆ TARTRAS, *L. D. E.*

TARTRATE OF POTASH.

Synonyme. Soluble Tartar.

The London Ph. does not give any directions for making this salt, which is placed in the Materia Medica.

Take of Bitartrate of potash, powdered, three pounds (*E.*), two pounds (*D.*).
Carbonate of potash, sixteen ounces, or a sufficiency.
Boiling water, six pints.

Dissolve the carbonate in the water; add the bitartrate till the liquor is neutralised; boil and filter. Concentrate the liquor, till a pellicle forms on its surface, and then set aside to cool and crystallise. The residual liquor will yield more crystals by further concentration and cooling.

Process.—The nature and composition of both the salts employed in this case are stated under their respective heads. When they are boiled together, the bitartrate of potash loses one of its equivalents of acid, which combines with the potash of the carbonate, and forms tartrate of potash: at the same time, the carbonic acid escapes with effervescence.

	Materials.	Results.
1 eq. carbonate of potash	1 eq. carbonic acid	1 eq. carbonic acid ↑.
	1 eq. potash	
1 eq. bitartrate of potash	1 eq. tartaric acid	1 eq. tartrate of potash.
	1 eq. tartaric acid	
	1 eq. potash	1 eq. tartrate of potash.

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* Taylor, Med. Jurisp. 4th edit. p. 124.

† Braith. Retros. vol. xxv. p. 348.

(Phillips)
ought not to affect the c

Composition.— The cr

1 eq. potash, 48; 1 e

$=KO,$

1 eq. potassium, 40; 1 e

$=K,$

Characters and te
(four parts, *E.*), the
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acetate of lead is dissolve

E. 44 grains in solution are
of nitrate of lead.

The only probable impurity i
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paper; or carbonate of potash,
and redden turmeric paper.

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Medicinal properties and uses.—
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POTASSÆ BITARTRAS, *L.D.E.*

Bitartrate of Potash.

Synonyme. Cream of Tartar.

Remarks. — This salt is not prepared artificially for medicinal purposes, and is therefore placed in the Materia Medica. It exists naturally in wines made from the juice of grapes, and being almost insoluble in diluted alcohol, is slowly deposited upon the sides of the cask, mixed with some of the colouring matter of the wine, and constitutes the *crust;* in this impure state, it is called *tartar*, but when dissolved in boiling water, and crystallised, it is colourless, and is termed *cream of tartar*. It is the gradual separation of this ingredient which occasions the great improvement in the flavour of wine during the first two or three years; and the presence of this slightly soluble acid salt constitutes the grand difference between the juice of the grape and the juices of other fruits from which wines can be obtained by fermentation. (See Wines.)

Properties. — Bitartrate of potash is usually seen as a white powder, but it may be obtained in the form of crystals, which are generally separate, but frequently adhere together in a cluster of numerous small crystals. It is not easy to trace any distinct regular figure, though their *primary form* is a *right rhombic prism*. They are colourless and generally transparent, owing to their hardness, which prevents their angles from being broken or powdered by an ordinary degree of friction. They are very slightly soluble in water, requiring sixty parts of cold, or fourteen parts of boiling water for their solution, which has a strongly acid flavour, reddens litmus paper, and decomposes the carbonated alkalies with effervescence. By a red heat the salt is decomposed, and the acid converted partly into charcoal, and partly into carbonic acid. It is this property which causes it to be employed for making the black flux used in reducing sulphuret of arsenic.

Composition. — Bitartrate of potash consists of

1 eq. potash, 48 ; 2 eqs. tartaric acid, 66×2, 132 ; 1 eq. water, 9 $=KO,2\bar{T},HO$; eq. 189.

Characters and tests. — It is sparingly soluble in water; the solution reddens litmus paper. It is converted into carbonate of potash by a red heat.

E. 40 grains in solution are neutralised by 30 grains of crystallised carbonate of soda; and when then precipitated by 70 grains of nitrate of lead, the liquid remains precipitable by more of the test.

It is not liable to accidental adulteration, but it is frequently adulterated with alum, and sometimes with bisulphate of potash. If chloride of barium throws down a precipitate insoluble in boiling dilute nitric acid, it shows the presence of a sulphate; and

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salt passes off by the ki
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valuable in fever accompa
acid urine; for its acidity
same time it acts beneficial
When very long continued,

Characteristics as a diuret
producing an alkaline effect
or depressing the system.

Dose. — As a *hydragogue*
combined with sulphur or
diuretic, ℈j to ʒj, frequently
mode of administering it, and
this salt in hot water, in which

POTASSII IO

Iodide of

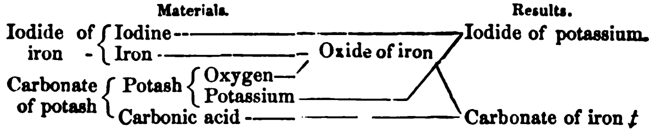
Synonyme. Hyd

D. Take of Iodine, dry, four o
Carbonate of potasl
Iron filings, two ou
Distilled water, thre

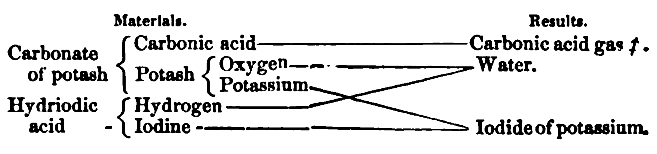
E. Iodine, dry, ℥v; Fine iron wi
of potash, dry, ℥ij and ʒvi.

This salt is now placed in the
College. The dir

Process.—When iodine and iron wire, or filings, are heated together in water, they combine, and, though both separately insoluble, they form a compound which is readily dissolved by the water; and the mixture, from being opaque and muddy, becomes clear and transparent. When quickly filtered, the solution which passes through has, at first, a *very pale* greenish tint; but this quickly disappears on exposure to the air, by which a portion of the iron becomes converted into sesquioxide, and falls as a brown precipitate, and the iodine is set at liberty, and is diffused through the water. When the quantity of the materials is large, considerable heat is evolved; and, even if used in small quantity, the heat employed to promote the combination causes the iodine to be rapidly sublimed and condensed in the neck of the flask, at the commencement of the operation, even at a temperature much below 100° F.; the presence of the water employed in the process does not prevent the volatilisation of the iodine. A considerable excess of iron should be present to insure the complete combination of the whole of the iodine. This is the first part of the process. In the second, carbonate of potash is added in exact atomic proportion, or in *very slight* excess; this decomposes the iodide of iron first formed. The potassium of the carbonate of potash combines with the iodine, forming iodide of potassium, which remains in solution, and the oxygen and carbonic acid set free, combine with the iron and form carbonate of iron, which is precipitated, and separated by filtration. The solution is next evaporated until crystals are formed.



If the carbonate of potash has been added in excess, it will be present in the solution, and the iodide will be so far adulterated. In order to prevent this, some manufacturers neutralise the excess of carbonate, by the addition of hydriodic acid, which forms iodide of potassium and water, with escape of carbonic acid. The hydriodic acid is obtained by passing sulphuretted hydrogen through iodine diffused in water; the hydrogen combines with the iodine, and the sulphur is precipitated.



Iodide of potassium may be made by adding iodine to liquor potassæ, until the solution acquires a *slight* brown tint. By this process, iodide of potassium and iodate of potash are formed, as is explained at length under CHLORATE OF POTASH, p. 560., all that is necessary being to substitute iodine wherever chlorine is mentioned in that article. The crystallised mixture is then to be heated to low redness, by which the iodate of potash is decomposed, and the whole of the oxygen driven off, leaving pure iodide of potassium. The objections to this method are, the expense of liquor potassæ, and the liability to lose a portion of iodide of potassium, which is sometimes volatilised at the temperature employed for decomposing the iodate. This, which is the most serious objection, may be obviated by mixing a sixth or tenth part of binoxide of manganese with the salts, previous to heating them. It has the property of causing the quick evolution of the oxygen at a much lower temperature than is otherwise requisite, and it does not itself undergo any change, and loss by volatilisation is thus prevented. The iodide of potassium may then be dissolved, and the solution, after filtration, evaporated till crystals form. The manganese may be dried and used again.

Properties.— Iodide of potassium is colourless, or has a slight yellow tinge, owing to a little uncombined iodine. It is odourless, or has a faint smell from the same cause; its taste is sharp, not very different from that of common salt; but it produces a disagreeable impression upon the throat, and sometimes excites an immediate slight flow of saliva. It crystallises in cubes, which may sometimes be found perfect; but the crystals generally resemble a number of small hollow cubes, fitted one within the other, which give a generally cubical figure to the entire crystal, though with irregularities which prevent its being smooth. When pure, it remains dry in a dry atmosphere, but attracts moisture if exposed to damp air. It cannot be called *deliquescent;* if it is, the presence of carbonate of potash is to be suspected. It is very soluble in water, requiring less than its own weight of boiling, and about its own weight of cold water for solution: it is also entirely soluble in alcohol, but it should be boiled in order to effect its quick solution. When the solution cools, it remains dissolved, but it does not readily dissolve in cold alcohol. When heated, it decrepitates, owing to adhering moisture; and at a full red heat it volatilises unchanged. Solution of iodide of potassium possesses the property of dissolving iodine, and rendering it soluble in water.

Composition.— Iodide of potassium consists of

1 eq. iodine, 126; 1 eq. potassium, 40=KI; eq. 166.

If water is present, or the salt is in solution, the water is supposed, by some chemists, to be decomposed; the hydrogen combines with the iodine, forming hydriodic acid, and the oxygen combines with the potassium, forming potash. These, united, form hydriodate of potash, the name formerly applied to it, and still used by some practitioners. It then consists of

1 eq. hydriodic acid, HI, 127; 1 eq. potash, KO, 48=KO,HI; eq. 175.

Characters and tests.—It is dissolved in 6 or 8 parts of rectified spirit; abundantly, in water. The watery solution changes the colour of turmeric brown, either not at all, or in a very slight degree; it does not change the colour of litmus: it becomes blue when nitric acid and (cold) starch are added at the same time; it is not coloured by tartaric acid added with starch. What is thrown down from the same (watery solution) by acetate of lead, is yellow, and is dissolved by boiling water; but it throws down nothing on the addition of lime-water or chloride of barium (or becomes merely hazy, *E.*). Further, if what is thrown down by nitrate of silver is digested in strong solution of ammonia, and nitric acid is afterwards added (in excess) to the strained liquid, nothing is thrown down from it (or it is rendered merely hazy, *E.*). From 100 grains dissolved in water, 141 grains of iodide of silver are thrown down, on the addition of nitrate of silver.

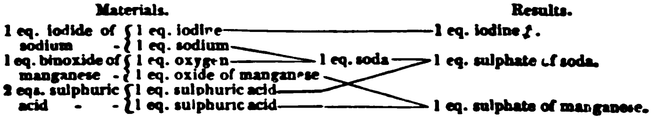
The most likely impurity is carbonate of potash, in consequence of its being added in excess in making the iodide of potassium; it is, in fact, generally in *slight* excess, as the iodide is less liable to spontaneous decomposition when this is the case. A *slight* excess, therefore, of carbonate can scarcely be considered an adulteration; and it will be indicated by a haziness or *slight* precipitate, on the addition of lime-water, or of nitrate or chloride of barium; if the precipitate is considerable, it shows a careless or fraudulent adulteration. Sulphate of potash and chloride of potassium may be present from impure carbonate of potash having been used; the barytes detects the former by causing a precipitate insoluble in nitric acid. Nitrate of silver causes a precipitate of iodide of silver, which is not soluble in solution of ammonia; if any chloride is present, it is precipitated as chloride of silver, which is soluble in ammonia; and when nitric acid is added in excess to this solution, it neutralises the ammonia, and the chloride of silver is again thrown down. The full weight of 141 grains of iodide of silver proves the whole salt to have been iodide of potassium. If any iodate of potash is present, it is decomposed by tartaric acid, or the solution becomes blue on the addition of starch.

The other tests given merely prove the presence of iodine. It is essential that the solution of starch should be cold, as no blue colour is produced by iodine and warm starch. Iodine only produces the blue colour when uncombined with any other body, and therefore the nitric acid is added with the starch in order to remove the potassium and set the iodine free.

IODINIUM.

IODINE. *Symb.* I. Eq. 126. Sp. gr. 5·4.

Remarks.—Iodine is obtained from kelp, which contains a small portion of iodide of sodium combined with carbonate and sulphate of soda. These are separated by solution, evaporation, and crystallisation; and the residual liquor called iodine ley, or mother-liquor, has a dark-brown colour, and contains the whole of the iodide in solution. To this liquor, sulphuric acid is added in slight excess, by which means carbonic and hydrosulphuric acid gases escape, and sulphur is precipitated; the liquor is now put into a leaden retort, and heated in company with binoxide of manganese; the iodine is set free and is distilled with aqueous vapour and collected in a glass receiver. Sometimes chlorine, from a separate retort, is transmitted through the solution, and the iodine is volatilised by heat, as above. If chlorine is employed, it combines with the sodium, and forms chloride of sodium, and the iodine is set free. If the sulphuric acid and manganese are employed, the acid combines with the manganese and one equivalent of oxygen to form sulphate of protoxide of manganese; the second equivalent of oxygen forms soda with the sodium, and the iodine is set free.



In addition to sea-weeds, in which iodine is always present in considerable quantity, M. Chatin has proved that it is also always present in nearly every species of aquatic plant (in all, indeed, which he examined), whilst it is either entirely absent, or cannot yet be discovered, in land plants. He finds, also, that whilst plants growing in running streams, or large bodies of water, are, comparatively speaking, rich in it, the same plants growing in stagnant water, or in small pools, though still containing some, are very poor in it. The iodine exists in the form of iodides, and appears to be derived from the soil through which the water runs, which accounts for the greater quantity found in plants in situations where the water is abundant or frequently changed than in stagnant pools, the water in which is soon exhausted of its iodine. This interesting discovery helps to explain the acknowledged benefit derived from water-cresses and other water plants, in scrofulous and tubercular affections, and also accounts for the greater wholesomeness of these plants when growing in running than in stagnant water.*

Properties.—Iodine is a dark-coloured solid, which is volatile, even at common temperatures; it rises rapidly in vapour at 347° F.; and, if water is present, I have found it quickly volatilised at a heat below 100° F. Its vapour has a rich violet colour, from which it takes its name (Ἰώδης, violet-coloured). It is remarkable that its sp. gr. is so differently stated by different authors. Thomson found it to be 3·08; Gay Lussac, whose statement is generally adopted, 4·9; and my own experiments showed it to be 5·4.* It is generally seen in small crystalline scales, which have a shining metallic appearance. Iodine requires 7000 times its weight of water for solution, yet it communicates a deep brown colour, and a perceptible taste, to the solution. Its taste and odour are very peculiar and offensive.

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* Pharm Jour. Aug. 1850.

The addition of iodide of potassium makes it readily soluble in water. It is soluble in about twelve times its weight of alcohol, and ether also dissolves it freely; it is precipitated from its solution in either by the addition of water. It acts energetically upon most metals, combining with them on mere contact, and forming compounds, some of which are deliquescent and soluble in water. It bleaches organic colours, but much less powerfully than chlorine or bromine.

Characters and tests.—Black; of a metallic lustre; it resembles chlorine in odour. It melts at first, on the application of heat, and is then sublimed in violet vapours. It is dissolved in rectified spirit; this solution affects starch with a blue colour. 39 grains of iodine, dissolved by a gentle heat, in 3 ounces of water, with 9 grains of lime, produce a solution of a yellow or brownish colour;

E. But the solution is colourless, if there be above 2 per cent. of water or other adulteration.

The most probable adulteration, and the only one against which the Pharmacopœias provide a test, is the presence of moisture, which is almost always present in small quantities.

When iodine is boiled with lime, they are converted into iodide of calcium and iodate of lime, both of which are colourless; 39 grains of iodine is rather more than sufficient to combine with 9 grains of lime, and the excess, though very slight, is sufficient to colour the water. If it contains 2 per cent. of moisture or other adulteration, there is no excess of iodine, and the solution is colourless.

Medicinal properties.—These are so numerous, and, in some respects, so contradictory, that it is almost a hopeless task to mention them all. Iodine and iodide of potassium so closely resemble each other, that it will be most convenient to speak of both at the same time. In large doses, iodine acts as an irritant poison, causing pain, vomiting, purging, and the ordinary symptoms of irritant poisoning. "Besides the usual signs of inflammation, in the dead body there is generally found a number of small, orange coloured, eroded spots in the mucous membrane of the stomach. One, or, at the most, two drachms are sufficient to cause death" (*Christison*). Iodide of potassium acts much less violently, and has been taken in doses amounting to several drachms in the day, without causing any inconvenience (*Elliotson*). In medicinal doses, both iodine and iodide of potassium possess a remarkable influence in causing the diminution or removal of enlarged visceral and lymphatic organs, indurated and thickened membranes (*e. g.* periosteum), and even of some natural organs and tissues. They also produce more benefit in the various forms of scrofula, than any other known remedy; and the rapidity with which syphilitic ecthyma and rupious ulcers heal and disappear under their use, is often astonishing. They are said generally to increase the secretion of urine, and their presence may be detected in the urine of patients taking them, by the blue colour produced on the addition of cold solution of starch, and one or two drops of nitric acid. The iodine appears very quickly in the urine. I have never detected it after a single dose, but have rarely failed in doing so after a second dose of four grains of iodide of potassium; I have only once failed in recognising its presence after the fourth dose, and in that case it appeared after taking the fifth. Its detection is extremely easy: if a few drops of the urine are mixed with an equal quantity of cold solution of starch, the addition of a single drop of nitric acid throws down a deep blue precipitate. I could not discover a trace of iodine in the saliva of a patient who had been copiously salivated by iodide of potassium. They generally cause some degree of dryness of the skin; and whilst in some cases they occasion diminution of appetite, dryness of tongue, and loss of flesh; in others they produce an opposite effect, and the patient gains flesh, and the appetite improves. Mr. Key has remarked that they check the progress of phagedenic ulceration in a remarkable manner, and dispose the ulcers to heal. Their action upon the uterus is matter of considerable doubt; some thinking them emmenagogue, whilst others have failed to perceive any change in the uterine secretion under their employment. I have found iodide of potassium and extract of conium with compound extract of colocynth, given in the intervals between the menstrual periods, followed by increased secretion and diminished pain in some cases of dysmenorrhœa, and scanty secretion; but those who doubt the efficacy of the iodide will attribute this result to the anodyne and purgative. When long continued, they produce a peculiar condition termed *iodism*, characterised by giddiness; loss of appetite, of flesh, and of strength; pain in the stomach; and a peculiar dusky colour of the skin; increased secretion of urine; cold, clammy sweats; and dryness of the mucous membrane of the nose. This state ceases when the administration of the drug is discontinued.

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* Lond. Med. Gaz. Nov. 15. 1844.

The efficacy of both is increased by their being combined, for the iodine loses some of its local irritating properties, and the iodide acquires increased energy. Dr. O'Shaughnessy has proved that iodine is quickly converted into hydriodic acid in the stomach, and, as such, is voided in the urine.

When applied locally, in a concentrated form, *iodine* acts as a powerful irritant, discolouring the skin, and causing severe burning pain which continues for ten or fifteen minutes; the cuticle cracks and separates in a day or two, and leaves the skin tender. I never but once saw it produce a sore, and I have applied a concentrated solution as a counter-irritant very frequently indeed. Iodide of potassium does not occasion so much local irritation as iodine, but both produce constitutional effects almost as quickly when applied to the skin, as when administered internally.

Objectionable effects produced by iodine. — *Salivation* has been noticed occasionally, but rarely. Some habits are peculiarly susceptible of its influence, and the state of iodism is so quickly induced as to prevent the continued use of the medicine. *Absorption* of the *mammæ* has been noticed in a few instances; and also *absorption* of *the testicle*. When less frequently employed than at present, these last effects were spoken of as if common, and excited some apprehension when the remedy was continued for a length of time. These fears were, however, unnecessary. Such cases have undoubtedly occurred, but they are very rare; I only know one instance in which absorption of the testicle was commencing; but the discontinuance of the medicine prevented its proceeding further. Pereira has not noticed it in any case, and other writers speak of it as being very uncommon. Dr. Lawrie has recorded three cases, in which small quantities of iodine caused great dyspnœa resembling spasmodic croup, two of which terminated fatally in a few hours, with œdema of the mucous membrane of the larynx, rima glottidis, and epiglottis.* Dryness of the throat is often noticed.

Differences between mercury and iodine. — Iodine is most beneficial in strumous habits, in which mercury is almost uniformly injurious. Mercury increases the secretions generally, and especially the salivary one, more uniformly than iodine, which sometimes produces no appreciable effect upon them. Iodine acts more decidedly than mercury upon the visceral and glandular organs, especially upon the thyroid gland (*Pereira*); but mercury acts more efficiently upon newly formed tissues in causing their absorption; hence iodine is employed for the cure of a bronchocele, but mercury is given to remove the freshly deposited lymph upon the iris, in iritis.

Uses. — Iodine and its compounds have been used in nearly every known disease; for when all likely means have failed in any case, recourse has then been had to iodide of potassium. I propose only to name the most important diseases in which it has been employed.

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* London Med. Gaz. vol. xxvi. p. 589.

Bronchocele.—No other remedy has been so efficacious in this disease. It is given internally, and is also applied externally upon the tumour. It frequently requires perseverance for many months to effect a cure, and it often fails entirely. If the tumour is painful and tender, leeches and other local antiphlogistics must be employed, before commencing with iodine. I have seen two immense bronchoceles in men, reduced in a few weeks to very moderate dimensions by the employment of a small seton, which was constantly dressed with the ointment of iodide of potassium, whilst the patient took at the same time small doses of the salt internally. In setting the seton I used merely a straight flat sewing-up needle, to avoid the risk of wounding any of the enlarged vessels in the tumour. The seton, therefore, only consisted of three or four threads of silk.

Scrofula.—Scarcely any form of this disease is not benefited by it. It may be given to disperse enlarged lymphatics, and to promote the healing of strumous ulcers; and even when the bones are affected, the remedy often produces excellent effects.

Secondary syphilis.—Its good effects are not more manifest in any disease than in syphilitic ecthymatous and rupious eruptions. It does not produce so much benefit in the scaly eruptions, to which mercury is, generally, more applicable. Inflammation of the bones, and hard periosteal nodes, have also been removed under its use.

Enlargement of the liver and spleen have been removed by it; and Dr. Ashwell has published some interesting cases in the 1st No. of the Guy's Hospital Reports, in which it was successful in dispersing *hard tumours* and *induration* of the *neck* of the *uterus.* Hard tumours in the *body* of this organ are little or not at all under its influence. Beside its internal administration, he applies about a drachm of an ointment, half the strength of the officinal unguent. iodinii comp., to the neck of the uterus every night, by means of the finger or a camel's hair pencil, which should be rubbed upon it for ten minutes.

Chronic mammary tumour of Sir A. Cooper.—Pereira mentions having seen it useful in these cases.

Diseased testicle.—I have seen, in the Leeds Infirmary, a testicle which had been condemned to amputation, having every symptom of malignant disease, and which weighed about a pound, reduced in the course of a month to a size not larger than double that of a healthy testicle, by the internal and local employment of iodine and iodide of potassium.

Hydrocele.—A drachm of an alcoholic solution of iodine in four or five ounces of water, has been used as an injection for the cure of hydrocele, after tapping; but it does not appear to possess any advantage over the injections in common use; and, in a case under the care of Mr. Key, it caused intense pain, which continued for two or three hours. It has also been used as an injection into the peritoneum and pleura after tapping for dropsy or empyema, but the results have generally been fatal or highly unfavourable.

Acute rheumatism.—I have given it, along with quinine, in several cases of this disease, almost from the commencement (within, at any rate, two or three days), and the recoveries have been much more rapid than usual; but I have not fully satisfied myself yet, how much of the advantage has been owing to the quinine, and how much to the iodine. (See Quinæ Disulph., *Uses*, *Acute Rheumatism*, p. 185.) The mixture is what is generally called unchemical, the sulphuric acid setting the iodine free. I have the most faith in the utility of the combination, when the joints are beginning to swell.

Chronic rheumatism.—Iodide of potassium has been frequently used in this most intractable disease, and has produced good effects; though, like everything else, it often fails. I have seen more benefit from small doses, of two or three grains, three times daily, than from the larger doses of eight grains to a scruple, which are sometimes administered.

Sciatica.—Dr. Graves suffered from a severe attack of this disease, which resisted all treatment for six weeks, until he began to take iodide of potassium to the amount of a scruple in the day, and in two or three days he was almost free from pain; and, in about a week, enjoyed his usual health. I have, however, seen it entirely fail in this disease, both in his hands and in those of other practitioners; and I have not seen any case but his own, in which it has been decidedly beneficial.

Typhus fever.—M. Aran has lately used the tincture of iodine in small doses (5 drops three times a day or oftener) in typhoid fever in the Hospital de la Pitié, with the effect of quickly cleansing and moistening the tongue, and abating abdominal pain and vomiting.* I am not aware of any other experience of its effects in this disease.

Ovarian dropsy.—It has seemed to do good in one or two cases, but its effects, generally, have not warranted any confidence being placed in it, in the treatment of this disease.

Skin diseases.—It has been frequently used in this class of diseases in both the moist and the scaly forms. In the former it is often productive of benefit, but I have not seen the latter much improved under its use. Mr. Garside, of Manchester, administers it extensively in lepra; but as he generally employs arsenite of potash at the same time, the success of his cases is doubtful evidence of the utility of iodine. Dr. Christison has generally found it fail in scaly diseases in Edinburgh. In chronic obstinate itch, often seen in workhouses, the liq. potas. iodid. co. often produces great benefit.

In checking the progress of phagedenic ulceration, Mr. Key has found it very useful when given internally.

Lead palsy.—Iodide of potassium has been used with more success in this affection than almost any other remedy (see p. 533.); but although it generally procures the removal of the lead by the kidneys, yet in one extreme case, reported in the Lancet, Dec. 1853, p. 522., no lead could ever be detected in the urine.

In *phthysis*, Sir Charles Scudmore speaks most confidently of the good effects of inhaling iodine and conium in vapour. He dissolves six grains of iodine, and an equal weight of iodide of potassium, in two drachms of spirit and six ounces of water; of this solution, he uses from one drachm to half an ounce, and one or two drachms of tincture of conium; these are added to hot water in a large, wide-mouthed, inhaling bottle. By this means all the air which is taken into the lungs passes through the solution of iodine and conium.

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* Ranking's Abs. vol. xviii. p. 265.

The *external* application of iodine is useful in many diseases. In bronchocele, scrofulous and other tumours, enlarged organs, and ovarian dropsy, it is applied in the form of ointment, and sometimes, also, to scrofulous ulcers, to promote their healing. To open sores, however, an aqueous solution of iodine and iodide of potassium is generally preferable. A saturated solution of iodine in spirit is applied, by a camel's hair pencil, to *lupus* with excellent effect (*Pereira*); and it is often used as a counter-irritant in diseases of the joints. In the *hip disease* of children it is often freely applied upon the trochanter over the nates, in Guy's Hospital, and it is painted over the knee in *chronic synovitis*. Mr. Shorten informs me that he has long used it extensively in the treatment of *scrofulous ophthalmia* with surprising benefit; he paints it freely round the orbit, making a broad ring upon the forehead and cheek, and repeats the application in two, or at the most in three, days; the application causes great pain for a few minutes. This plan possesses many advantages. It is an efficient counter-irritant; and, at the same time, improves the health generally; it cannot be removed like a blister, and, being applied in a few seconds by the surgeon himself, cannot be neglected; it also produces so much discolouration that the parent is obliged to keep the child in the house and out of the cold, which is sometimes an important matter with the children of the poor. My own experience amongst the children in a large workhouse confirms the accuracy of his statements. In chronic *strumous corneitis*, either occasioned by a granular condition of the inner surface of the eyelids, or simply accompanied by it, the application of the liq. potas. iod. co. (f℥i or f℥ii in f℥i of water) to the granular surface, by means of a paint brush, is often of remarkable service, and is in frequent use at the Liverpool Eye and Ear Infirmary. It may be used in almost any case in which continued counter-irritation is desirable, in a part where it is difficult to apply a blister, as behind the ears, in cases of chronic discharge from this organ, following scarlatina or any other disease. In *aphonia*, dependent upon chronic inflammation of the larynx and fauces, Dr. Bennett has observed considerable benefit from the free application to the throat externally, of a saturated solution of iodine in alcohol. The benefit has been much greater than that derived from blistering in the same cases. When, however, there is a thickened and rough condition of the pharyngeal mucous membrane, this remedy does not supersede the necessity for the application of local agents, such as solution of nitrate of silver, &c.*

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* Braith. Retrosp. vol. xxviii. p. 113.

Lugol uses it in the form of a bath, in most of the cases requiring the internal employment of iodine. He finds that iodide of potassium alone is not efficacious in this way, and always combines iodine with it. I have found it a very valuable application in porrigo of the scalp; it should be freely painted on, every second or third day; the scalp being poulticed the previous night.

Antidotes. — Iodine is never taken as a poison intentionally, and it is scarcely possible that it could be accidentally swallowed. Emetics, and draughts containing solution of starch or arrowroot, or sago, and the treatment requisite for the subsequent inflammation, are the only remedies.

Incompatibles. — Iodide of potassium should be given in simple water, sweetened if desirable. But it may be given with bitter infusions or decoction of sarsaparilla or dulcamara. All the mineral acids are incompatible with it, unless added in very small quantities. I frequently add iodide of potassium to a mixture containing quinine, dissolved by the aid of ♏x or ♏xii only of dilute sulphuric acid in an eight ounce mixture; and in this case the quantity of acid is so small that it does not prevent the formation of a perfectly clear mixture.

Dose and administration. — There is scarcely any medicine of which the dose varies so widely; most practitioners give from gr. iij to gr. vi as a dose, but many give ℈j to ℥ss. It is difficult to account for this difference; but my experience is, that when the medicine does good, it is as efficacious in the small doses as in the larger ones, and that the large quantities are simply borne, and do no harm; sometimes, indeed, the small doses relieve after large ones have failed. It is probable that, whether in large or small doses, a considerable proportion is speedily removed from the system by the kidneys, and that the large quantities occasion less effect than we should anticipate, in consequence of being carried off in this way.

The above remarks apply only to iodide of potassium, iodine alone being seldom given in larger doses than one or two grains.

Differences in the administration of iodine and iodide of potassium. — Iodine is very seldom administered alone, and its offensive taste renders solution an objectionable form. It may be made into pills with confection of roses and liquorice powder. It is generally given in solution of iodide of potassium, as in the liq. potas. iodidi comp. Iodide of potassium may be made into pills with any soft extract, such as an extract of conium or hyoscyamus. When made into ointment, it ought to be dissolved in a few drops of water previous to being mixed with the lard, as, if this is not done, it is gritty and unpleasant. *Lard*, and *not spermaceti* ointment, ought always to be used, as the latter frequently decomposes the iodide, setting iodine free and discolouring the ointment: this effect is probably owing to the presence of a small quantity of chlorine in the white wax of the ointment, which is often bleached by this gas.* Kallhofert has, however, found that the ointment becomes discoloured in about a week, even when perfectly pure fresh lard has been used.*

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* Bell, Pharm. Jour. Jan. 1845.

LIQUOR POTASSII IODIDI COMPOSITUS, *L. D.*

COMPOUND SOLUTION OF IODIDE OF POTASSIUM.

Synonyme. Lugol's Solution of Iodine (?).

Take of Iodide of potassium, ten grains.
Iodine, five grains.
Distilled water, a pint.
Mix, that they may be dissolved.

Remarks. — The iodide of potassium renders the iodine soluble in water, though, when alone, it is almost insoluble, and the solution has a brown or yellow colour; it may be mixed with more water, without producing any change. Though I have added "Lugol's solution" as a synonyme, it is not strictly correct, as this does not correspond exactly with any of his many solutions. It is little more than one-eighth of the strength of his concentrated solution. It may be administered in any of the cases in which the compounds of iodine are employed, and though the presence of the free iodine makes it more unpalatable, yet it is thought to add considerably to its efficacy. It is sometimes employed as a bath in various forms of scrofula; and, when used in this way, the presence of free iodine is essential. Lugol found that the iodide of potassium alone did not produce good effects when used as a bath.

Medicinal properties and uses. — See POTASSII IODIDUM, p. 571.

Dose and administration. — It is extremely difficult to fix the dose, as different practitioners give such widely varying quantities. From f℥j to f℥ij, twice or three times daily, is as much as the stomach can easily bear; it may be advantageously combined with sugar, if not mixed long before being used. For a bath, ʒiij of iodine and twice as much iodide of potassium may be dissolved in thirty or forty gallons of water. The bath must be made of wood, or lined with Dutch tiles, as metals are acted upon by the iodine.

POTASSÆ SULPHAS CUM SULPHURE, *E.*

SULPHATE OF POTASH WITH SULPHUR.

Take of nitrate of potash and sulphur, equal parts.

Mix them thoroughly; throw the mixture in small successive portions into a red hot crucible; and, when the deflagration is over, and the salt has cooled, reduce it to powder, and preserve it in well-closed bottles.

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* Bell, Pharm. Jour. Aug. 1845.

Remarks. — When the above materials are exposed to a red heat, the oxygen from the nitric acid of the nitre oxidises some of the sulphur and converts it into sulphuric acid, which combines with the potash of the nitre, and after deflagration there remains in the crucible a mixture of variable proportions of sulphate of potash and sulphur.

Properties and uses. — Similar to those of potassii sulphuretum.

POTASSII SULPHURETUM, *L. D. E.*

SULPHURET OF POTASSIUM.

Synonyme. Hepar Sulphuris, *D.* Liver of Sulphur.

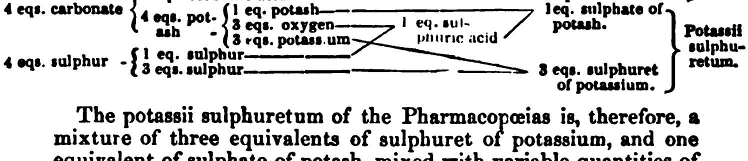
This is now placed by the London College in the Materia Medica. The Dublin and Edinburgh Phs. correspond essentially in their directions for making it.

Take of Sulphur, four (*D.*), one (*E.*), ounces.
Carbonate of potash, seven (*D.*), four (*E.*), ounces.

Rub them intimately together, and heat them in a covered crucible till they form a uniform fused mass (*D. E.*). Let the liquid contents be then poured into an iron cup, over which a second vessel should immediately be inverted, so as to exclude the air as completely as possible during solidification (*D.*). When cold, it is to be broken into pieces and kept in well-stopped bottles (*D.E.*).

Process. — In this preparation, there is a *small* excess of sulphur in the Ph. Ed., and a *large* one in the Ph. Dub., over equal equivalents. When they are heated together, somewhat complicated changes are produced, which will be best illustrated by taking four equivalents of each.

The whole of the carbonate of potash is decomposed, and 3 eqs. of the potassium combine with 3 eqs. of sulphur to form 3 eqs. of sulphuret of potassium; the 3 eqs. of oxygen separated from the potassium combine with the fourth eq. of sulphur, and form sulphuric acid, which combines with the fourth eq. of potash, forming sulphate of potash, whilst all the carbonic acid is driven off by the heat.



The potassii sulphuretum of the Pharmacopœias is, therefore, a mixture of three equivalents of sulphuret of potassium, and one equivalent of sulphate of potash, mixed with variable quantities of sulphur in excess.

Properties. — Sulphuret of potassium, when freshly made, has a liver-brown colour, from which it derived its old name of *liver of sulphur*, and emits an odour of sulphuretted hydrogen when moistened, though it is inodorous whilst dry. It is hard, but is readily dissolved by water. If exposed to the air, both the potassium and the sulphur absorb oxygen, and, instead of the original compound, the whole becomes converted into *white* sulphate of potash. Hence, if this preparation is colourless, it may be at once set down as bad, though it might have been good originally. The sulphuret of potassium is the only valuable part of the preparation, and is that which communicates the characteristic properties.

Composition.—When made according to the above directions, it consists of 3 eqs. of sulphuret of potassium, mechanically mixed with 1 eq. of sulphate of potash, and some uncombined sulphur; but these proportions are liable to vary, according to the care with which it has been prepared, and the degree of subsequent exposure to the air.

Compounds for which it may be mistaken.—None.

Medicinal properties and uses.—Sulphuret of potassium is very rarely used internally, and is employed chiefly in the form of a bath. It is irritant in large doses; and, when swallowed, causes eructations of hydrosulphuric acid. It has been recommended for the cure of scabies, lepra, psoriasis, and other obstinate scaly diseases, when other remedies have failed.

Dose and administration.—For internal use the dose is gr. iij to gr. v, in pills. For a bath, ℥iv may be dissolved in a sufficient quantity of water; the bath should be made of *wood*, as *metal* would be acted upon by the hydrosulphuric acid evolved. It is without value as an antidote for mineral poisons, and is itself an active poison when taken in large doses.

Incompatibles.—All metallic salts and acids.

POTASSII FERROCYANIDUM, *L. D. E.*

FERROCYANIDE OF POTASSIUM.

Synonyme. Prussiate of Potash.

Manufacture.—This salt is placed in the Materia Medica, as it is only made on the large scale. It is prepared by heating to redness in iron pots, blood, offal, woollen cloths, or animal matter of any description, along with carbonate of potash (pearlashes), and stirring them up with an iron rod. During this process, the nitrogen of the animal matter combines with carbon contained in it, and forms cyanogen, NC^2, which combines with the potassium of the pearlashes and the iron of the pot and the iron stirrers, and forms ferrocyanide of potassium. The mass is then dissolved in water, and the solution, being evaporated, yields large yellow crystals of ferrocyanide of potassium.

Characters.—Yellow. It is dissolved by water: the solution is not changed on the addition of any alkali, or of tincture of galls: what is thrown down from it by sulphate of iron is first (*greenish*) white, but soon becomes blue; what is precipitated by sulphate of copper is brown; by (*pure*) sulphate of zinc, white. By heat it loses its colour, and 12·6 grs. of water from 100 grs. of the salt. It is entirely decomposed by a red heat; what remains is dissolved by hydrochloric acid, and is again thrown down on the addition of ammonia. From 100 grains, 18·7 grains of sesquioxide of iron are obtained. Lastly, if this salt is boiled with dilute sulphuric acid, it exhales an odour of hydrocyanic acid.

This salt is not liable to adulteration, and the above characters merely distinguish it from other bodies, and indicate some of its uses, viz. as a test for iron and copper, and to furnish medicinal hydrocyanic acid, which see.

Composition.—Ferrocyanide of potassium consists of.

2 eqs. cyanide of potassium; 1 eq. cyanide of iron; 3 eqs. water $=2KCy+FeCy+3HO$; eq. 213.

Medicinal properties and uses.—This salt is only employed for obtaining dilute hydrocyanic acid. It does not appear to be poisonous when administered, even in a large dose, and there is no proof of its possessing medicinal properties.

POTASSII CYANIDUM. (Not Off.)

Cyanide of Potassium. KCy, Eq. 66.

This salt has been employed medicinally as a substitute for hydrocyanic acid; but it is liable to spontaneous changes which render it uncertain, and I am not aware that it is now ever employed. It is formed in large quantity in the lower part of smelting furnaces; and four persons were killed near Sheffield, by its escape in the form of vapour through a crack in a blast furnace, which communicated with the room in which they slept.*

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* Heywood, Med. Times and Gaz. Dec. 1853, p. 639.

PRÆPARATA E SODIO.

PREPARATIONS OF SODIUM.

SODIUM. *Symb.* Na. Eq. 24. Sp. gr. 0·97.

Sodium is the metallic basis of soda, and is obtained from acetate of soda, by processes similar to those for obtaining potassium from bitartrate of potash. It requires a higher temperature for its volatilisation; but the process is so cheap, and the product so abundant, that if required on the large scale for manufacturing purposes, the metal could be obtained almost as cheap as zinc.

Sodium is a brilliant white metal, resembling silver in colour and lustre. It is so soft as to be easily cut; is malleable, and quickly absorbs oxygen and becomes tarnished; it absorbs this gas rapidly from the air, or from any fluid containing it, and must, therefore, be kept in pure naphtha, which is entirely free from oxygen. When thrown upon water it decomposes it, like potassium, and combines with the oxygen, forming soda, whilst the hydrogen is set free as gas. The metal does not, however, take fire, nor is an inflammable sodiuretted hydrogen formed, as in the case of potassium. The soda, as it forms, is dissolved by the water, to which it communicates alkaline properties. Sodium combines with oxygen in two proportions, but the first or protoxide, soda, is the only one of importance, and it is this oxide which forms salts with acids. Like potash, pure soda combines with 1 eq. of water, forming a hydrate, but this is not used in medicine.

Hydrate of soda, $NaO+HO$; eq. 41.

Remarks upon the compounds of sodium generally.—Soda is an alkali obtained from the ashes of marine vegetables, as potash is from those of land plants. The source of the soda in sea weeds is, in all probability, the chloride of sodium contained in the sea water, by which they are nourished. Nearly all the compounds of sodium are soluble in water. Some of them contain water of crystallisation, but some are anhydrous. Many of those which contain water give it off when exposed to the air, or *effloresce*, and *none* of them (except the oxide and valerianate very slightly) absorb water from the air, or *deliquesce;* by which they are distinguished from the salts of potash, some of which *deliquesce*, but *none* of which *effloresce*. It is probably owing to this difference with respect to water, that when caustic soda is boiled with oils or fats, it forms a *hard* soap; when caustic potash is similarly treated, it forms a *soft* soap. The only substance which forms an insoluble compound with soda is antimoniate of potash, which is accordingly used as a test for this alkali. Soda may be recognised by its effect upon the colour of flame; when any compound of sodium is dissolved, and a piece of waxed cotton is dipped into the solution and held for a moment in the *blue* part of the flame of a spirit lamp, it immediately becomes yellow, and the difference of colour may be rendered more apparent by withdrawing and reintroducing it, as is more fully described under the article Potash. Hydrofluosilicic acid produces a gelatinous precipitate with both potash and soda salts; but that from potash is amorphous, whilst the soda one may be seen, under the microscope, to consist of six-sided crystals.* (See *Remarks upon the compounds of Potassium generally.*)

LIQUOR SODÆ (CAUSTICÆ, *D.*), *L.D.*

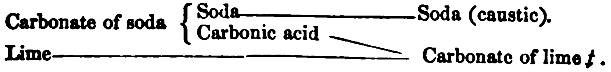
Solution of (Caustic, *D.*) Soda.

Take of Carbonate of soda, thirty-one ounces.
Lime, nine ounces.
Boiling distilled water, a gallon.

Prepare the solution in the same manner as is ordered for Liquor Potassæ.

D. Carb. soda, ℔ij; Lime, ℥x; Water, cong. i. and f℥vii.
The Dublin directions are the same as for the Dublin Liq. Potas.

Process.—In this case, as in that of liquor potassæ, the lime combines with the carbonic acid of the carbonate of soda, and forms a precipitate of carbonate of lime, whilst the soda (caustic) remains dissolved in the water.



The Dublin solution is slightly weaker than that of London; ♏xv of the latter being equal to ♏xvi of the former.

Characters and tests.—Its sp. gr. is 1·061, *L.*; 1·056, *D.* In 100 grains are contained 4 grains of soda. In other respects it corresponds with liquor potassæ.

Medicinal properties and uses.—The same as those of liquor potassæ. It is supposed by some persons to agree better with the stomach, owing, perhaps, to the fact that salts of soda are present in some abundance as natural ingredients in the fluids of the body (as the blood, &c.), whilst salts of potash are much less abundant.

Dose.—This solution is not very different in strength from liquor potassæ, though the latter contains 6·7 grains per cent., and the liquor sodæ only 4 grains; the reason being, that soda possesses much greater neutralising power than potash,—32 grains, the eq. of soda, being equal to 48 grains, the eq. of potash; the dose is, therefore, the same, viz. ♏x to ♏xxx, or even to f℥j or f℥ij, according to the nature of the case.

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* Gmelin's Handbook of Chem. (Cavend. Soc.), vol. iii. p. 77.

SODÆ ACETAS, *D.*

ACETATE OF SODA.

Take of Crystallised carbonate of soda of commerce, one pound, or sufficient.
Acetic acid of commerce (sp. gr. 1·044), one pint.

Add the soda to the acid, leaving a slight excess of acid, and evaporate until a pellicle forms, and then set by to crystallise; dry the crystals upon a porous brick, and keep them in well-stopped vessels. The mother liquor contains more of the salt, which will be obtained by a second evaporation.

Composition.— Acetate of soda consists of

1 eq. soda, 32; 1 eq. acetic acid, 51; 6 eqs. water, 9×6, 54 $=NaO,\bar{A},6HO$; eq. 137.

Properties.—Acetate of soda is generally in small flattened crystals, the *primary form* of which is an *oblique rhombic prism*, but the common form is very complicated. They are soluble in water, have a sweetish taste, and when heated with sulphuric acid are decomposed, and the acetic acid is driven off.

Uses.—It is not used medicinally.

SODÆ CARBONAS (CRYSTALLIZATUM, *E.*), *L. D. E.*

CRYSTALLISED CARBONATE OF SODA.

Synonyme. Sodæ Subcarbonas.
(When impure,—Barilla, Kelp, Black Ash, White Ash.)

Preparations. — This is introduced into the Materia Medica, and the College, therefore, gives no directions for its preparation. It is manufactured on the large scale by two totally different methods, both of which will be described.

From sea-weed.— During the war, and until of late years, this was the only source of carbonate of soda. On the rocky coasts of Ireland and Scotland, and the Scottish Islands, the sea-weed was collected in large quantities and burned. The ashes consisted, principally, of impure carbonate of soda, with a small quantity of iodide of sodium, and some earthy salts. They were lixiviated, and the impure saline mass obtained by evaporation, constituted kelp. Barilla, which is chiefly obtained from Ireland, is made by burning various plants of the nat. ord. *Chenopodiaceæ*, and treating the ashes in a similar manner.

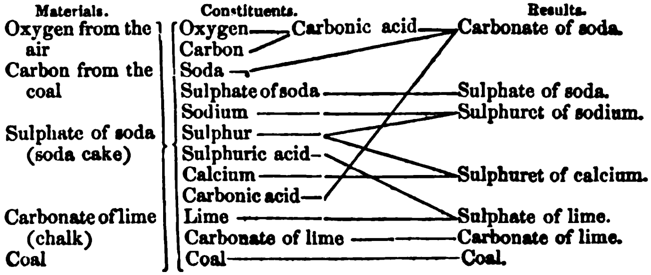
From chloride of sodium (common sea salt). — Of late years it has been extensively manufactured from this substance, but the salt which is obtained from this source differs from kelp, in containing no iodine.

The general process for making carbonate of soda is as follows:— Chloride of sodium is first heated with strong oil of vitriol (hydrous sulphuric acid), by which it is decomposed; hydrochloric acid is driven off, and dry sulphate of soda remains. (See Acid. Hydrochlor. p. 84.) This sulphate of soda is then mixed with an equal weight of chalk and half its weight of small coal, and the mixture is thrown into a reverberatory furnace, in which it is strongly heated for about an hour, and frequently stirred. It fuses, and is then drawn out into moulds, and constitutes "ball barilla," or "black ash," from the dark colour communicated by a quantity of coal which is mixed with it. This "black ash" consists, chiefly, of carbonate of soda, sulphate of soda, sulphate of lime, chalk and coal; and when put into warm water the three last are left behind, and the salts of soda are dissolved. When the solution is evaporated, it forms "white ash," which is still very impure; but, on redissolving and crystallising it with great care, the crystallised carbonate of soda is obtained, which is tolerably pure.

Theory of the process. — When sulphate of soda is heated in contact with carbon (in the coal) the changes which take place are somewhat complicated. The carbon of the coal, combining with oxygen from the air, forms carbonic acid, which combines with some of the soda from the sulphate, forming carbonate of soda — the object of the whole process; and another portion is formed by carbonic acid, from the chalk, combining with soda from the sulphate. Some of the sulphate of soda remains unchanged, but part of it is decomposed; and some of the sulphur combines with sodium, from the soda, forming sulphuret of sodium.

Another portion of sulphur combines with calcium from the chalk, forming sulphuret of calcium; and some undecomposed acid combines with lime, forming sulphate of lime. Some of the chalk remains unchanged, and some of the coal is unburnt; and all these results, as shown in the column below, being fused together, constitute "black ash." But even these changes, complicated as they are, do not show all that are produced; the others, however, are less important, and are omitted, to avoid confusion.

In the following diagram the constituents of the materials used are indicated without any reference to the equivalents employed; it must be assumed that there is as much as we want of each substance.

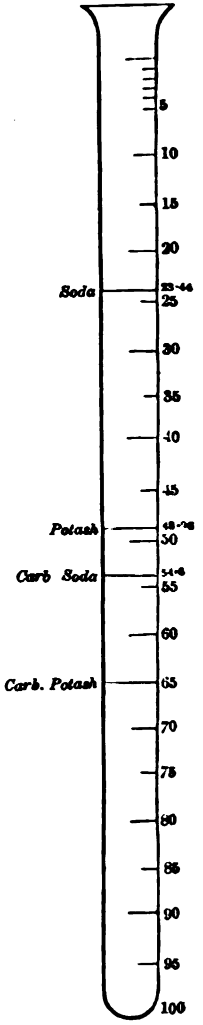


For a more detailed account of these changes, the reader may consult Graham's or Brande's works on chemistry.

A superior process has been lately patented, but has not yet come into general use, for making the sulphate of soda (soda cake) without employing sulphuric acid. Iron pyrites (sulphuret of iron) and rock salt are mixed together, and heated for three days in a reverberatory furnace, with free access of air; both the sulphur and sodium are oxidised by the air, and sulphuric acid and soda are formed, which combine and form the "soda cake." The greater part of the chlorine, from the salt, combines with the iron of the pyrites, and forms chloride of iron, a considerable portion of which is volatilised by the heat; the remaining iron is oxidised, and forms sesquioxide of iron, "crocus," which is separated from the sulphate of soda by lixiviation. The remaining steps for converting the sulphate into carbonate of soda, are the same as have been already described.

Uses.—The impure carbonate of soda is not administered internally, but when purified it furnishes the carbonate of soda, which is employed in medicine.

Alkalimetry.—For commercial purposes, it is important to know the quantity of carbonate of soda present in any specimen under examination. This may be ascertained by neutralising the alkali with some acid of known strength, and noting the amount of acid required, which will indicate the quantity of alkali neutralised. But this, as formerly managed, was a slow and troublesome operation; and in order to gain the same object by a simpler method, Dr. Faraday invented the instrument now commonly known as the "alkalimeter." A tube is taken, nine or ten inches long and three-quarters of an inch in diameter, and capable of holding 1000 grains of the weak acid about to be described. This is to be graduated into 100 degrees, counting from above downwards. Opposite 23·44, soda is to be marked; opposite 48·96, potash; 54·6, carbonate of soda; 65, carbonate of potash: the tube is now ready for use. Next take sulphuric acid of sp. gr. 1·849, or, as



nearly as possible, 1·85, and dilute it with four times its weight of water, and keep this ready for use. The mode of employing it is as follows: An ash is to be examined to find the proportion of anhydrous carbonate of soda present in it. Take 100 grains of the ash and dissolve it in any convenient quantity of water. Then fill the tube with the diluted acid, to the height marked carbonate of soda, and fill it up with water. Add the acid, thus further diluted, to the alkaline solution until it is neutralised, and see how much has been employed. Every degree of acid used indicates one grain of carbonate of soda in the ash. If the ash to be tested is carbonate of potash, the tube must be filled with acid to 65, and then filled up with water and used as before; if soda is to be searched for, fill the tube to 23·44, and proceed as before.

It is not, at first sight, apparent how these numbers are arrived at, but a little consideration will make it plain. To take carbonate of potash as the first example, 100 grains of which are employed, whilst the quantity of the dilute acid which is taken is 35 degrees, as will be seen at once, by counting from the bottom of the tube. The acid which is first taken is very nearly a protohydrate, or contains 1 eq. of water to 1 eq. of acid. As the eq. of sulphuric acid, or its neutralising power, is 40, if 1 eq. of water is added, 49 parts will be necessary, instead of 40, to neutralise 70 parts, or the equivalent, of anhydrous carbonate of potash. But the strong acid is directed to be diluted with four times its weight of water; or, to every 49 parts must be added 196 (49 × 4) parts of water, which will make, together, 245 parts. If, then, 49 parts of strong acid neutralised 70 parts of anhydrous carbonate of potash, 245 of this dilute acid will be required to produce the same effect. It is not, however, 70 grains of carbonate of potash which we are examining, but 100 grains; and it is required to find the quantity of dilute acid necessary to neutralise this quantity; therefore,

Eq. of pot. carb.		Eq. of the dilute acid.		Quant. of pot. carb. taken.		Quant. of acid required.
As 70	:	245	::	100 grs.	:	350 grs.

As the tube was divided into 100 degrees, and made to contain 1000 grs., each division contains 10 grs., and the 35 divisions contain the 350 grs. required; and the tube being afterwards filled up with water, the 350 grains are made to occupy 100 degrees.

If then the whole of the sample under examination were carbonate of potash, the whole of the acid would be employed, or one degree for each grain of the alkali; but if half of it, or any smaller or larger proportion, were an insoluble substance, or were chloride or any other neutral salt of potash, half the acid, or a corresponding proportion, would not be employed: each degree of acid used indicates, therefore, one grain of the carbonated alkali.

If the calculation is made for soda instead of carbonate of potash, as in the above example, it will be found that 765·6 grs. of the dilute acid will be required to neutralise 100 grs. This being divided by 10 gives 76·56 as the number of degrees required; which corresponds with the 23·44 from the top of the scale.

	Eq. of soda.		Eq. of the dilute acid.		Quant. of soda taken.		Quant. of acid required.
As	32	:	245	::	100 grs.	·	765·6 grs.

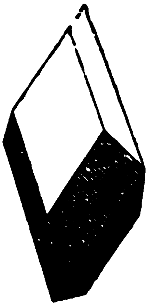
The other numbers may be ascertained by a precisely similar method.

Properties.—Carbonate of soda occurs in large crystals, which are very characteristic in their form and appearance. The *primary* form is an *oblique rhombic prism*. They are seldom entire; but the broad, diamond-shaped face may always be recognised, more or less, as well as the bevilled edges. They contain a large quantity of water of crystallisation, which is given off on exposure to the air, this being a striking example of an efflorescent salt. The surface is therefore seldom translucent throughout, but upon the edges and faces it is more or less covered with a white, opaque powder of effloresced carbonate of soda.

This salt is very soluble, and is dissolved by about two parts of cold, and less than its own weight of boiling water. The solution has an alkaline, disagreeable taste, and reddens turmeric paper. When the salt is heated, it melts, and boils in its own water of crystallisation, and ultimately loses the whole of its water. It does not part with its carbonic acid, even at a red heat.

Composition.— Ordinary crystals of carbonate of soda consist of

1 eq. soda, 32; 1 eq. carbonic acid, 22; 10 eqs. water, 9×10, 90=$NaO,CO^2,10HO$; eq. 144.



But when formed at a temperature of 80° F., they contain only seven equivalents of water (*Turner*).

Characters and tests.—Colourless; slightly transparent. It presently falls into powder when exposed to the air. It is dissolved in water; the solution changes the colour of turmeric to brown; when supersaturated by hydrochloric acid, nothing is thrown down from it by chloride of barium. 100 grains of carbonate of soda lose 62·5 grains of water in a hot fire; whilst they lose 15·28 grains of carbonic acid on the addition of dilute sulphuric acid.

The most probable impurity is sulphate of soda, derived from the process of manufacture, which would be detected by the chloride of barium. The loss of 15·28 grains of carbonic acid proves that it is all carbonate.

Salts for which it may be mistaken.—It could only be mistaken for some other salt of soda, its efflorescence distinguishing it from all other classes of salts which are employed medicinally. It is most likely to be mistaken for the phosphate of soda, which is also efflorescent; but it is distinguished by its diamond-shaped face and its bevilled edges. The phosphate is a thinner and flatter crystal, and is not so characteristic in its form.

Medicinal properties.— *Antacid.* It agrees in general properties with the alkalies as a class. When taken in too large doses, it acts as an irritant to the stomach and bowels, and impairs the digestion. In moderate doses it corrects acidity of the stomach, and acts as a diuretic upon the kidneys, rendering the urine, at the same time, alkaline. It is milder and less irritating than the corresponding salt of potash, but frequently fails to produce the same good effects in diseases accompanied by, or causing an acid state of the urine. In excessive doses it causes inflammation of the stomach and small intestines.

Uses.— Carbonate of soda is not often used internally on its own account. It enters into the formation of the pil. ferri comp., but is converted into the sulphate during the changes effected in making the pill. It may be given in *dyspepsia* accompanied with very acid secretions, and in acid states of the urine; but its good effects in calculous affections are frequently inferior to those of potash; for the compound of soda and uric acid is very insoluble, and constitutes, in fact, the chalky deposit in the joints of gouty persons. Its employment must not be continued too long, as it will of itself ultimately produce disease, by neutralising the natural acid secretions of the stomach, which are essential to healthy digestion. It is often much better to give some mineral acid as a tonic, combined with some bitter infusion. It is sometimes given with a vegetable acid, in the form of an effervescing draught; but, owing to the small quantity of carbonic acid which it contains, it is not so useful for this purpose as the bicarbonate of soda.

It has been strongly recommended in *hooping cough*, combined, at first, with ipecacuanha and opium, and afterwards, when the severity of the disease has been subdued, with myrrh. In *bronchocele* it has been extensively used by M. Peschier.

It has been recommended as an external application in chronic lepra and psoriasis; and for this purpose it should be dissolved in water, and used as a bath; three-quarters of a pound or a pound of the salt to a bath full of hot water is the proper quantity.

Antidotes.— Oils or soap, and milk, and afterwards such treatment as may be required to relieve the inflammation which is set up.

Dose.— Gr. x to ʒss. The former is the usual dose, if given in dyspepsia; and it is best combined with some bitter infusion, as that of calumba; if given with an acid, in the state of effervescence, the larger dose must be used. In hooping cough and bronchocele, ʒss has been given three times daily.

SODÆ CARBONAS EXSICCATA, *L. D. E.*

DRIED CARBONATE OF SODA.

Synonyme. Sodæ Carbonas Siccatum, *D. E.* Sodæ Subcarbonas Exsiccata.

Take of Carbonate of soda, a pound.

Apply heat to the carbonate until the crystals fall away, and afterwards heat it to redness. Lastly, rub it to powder.

The Dublin College does not direct the heat to be carried so high as redness.

Process.—The greater part of the water which crystallised carbonate of soda contains, is first expelled by a moderate degree of heat; and the total expulsion is effected by ignition; it is applied moderately at first, because the fused salt, if strongly heated, would boil over.

Composition.—Dried carbonate of soda consists of

1 eq. soda, 32; 1 eq. carbonic acid, 22 = NaO,CO^2; eq. 54.

Medicinal use.—In this dry state, carbonate of soda may be exhibited in the form of powder or pill, mixed with other medicines.

Dose.—Gr. v to gr. x. Twelve grains of the dry are equal to thirty-two grains of the common carbonate of soda. For the properties and uses, see SODÆ CARBONAS, p. 595.

SODÆ CARBONATIS LIQUOR, *D.*

SOLUTION OF CARBONATE OF SODA.

Take of Crystallised carbonate of soda of commerce, one ounce and a half.
Distilled water, one pint.

Dissolve and filter. Sp. gr. 1·026.

Uses.—This furnishes a standard strength for prescriptions. ♏xiv contain gr. j of the salt.

SODÆ BICARBONAS, *L. D. E.*

BICARBONATE OF SODA.

Synonyme. Sodæ Sesquicarbonas, *Ph. L.* 1836.

This salt is now placed in the Materia Medica, as it can only be prepared advantageously upon a large scale.

Process.—The remarks under this head in the article BICARBONATE OF POTASH are equally applicable in this place, if soda is substituted for potash; and it is therefore unnecessary to repeat them.

Properties.—Bicarbonate of soda is colourless, and is generally seen in a powdered state; for though capable of forming crystals, they are very small and indistinct, and scarcely have a crystalline appearance. It is soluble in either hot or cold water, requiring about ten parts of the latter for solution. It is decomposed at a temperature below 212° F., and reduced to the state of carbonate by the loss of the extra equivalent of carbonic acid. The solution is slightly alkaline in its action upon turmeric paper; has a soapy flavour, but not nearly so strong as that of the carbonate; is decomposed by the strong acids, with the escape of carbonic acid gas; does not produce a precipitate in solution of sulphate of magnesia; and *possesses* the property of *almost entirely concealing the offensive flavour of that salt.*

Characters and tests.—It is dissolved by water. It slightly changes the colour of turmeric to brown; from this solution neither bichloride of platinum nor sulphate of magnesia, unless when heat is applied, throws down anything; what chloride of barium throws down is dissolved by hydrochloric acid. 100 grains of this salt, when added to dilute sulphuric acid, emit 51·7 grains of carbonic acid.

E. A solution in forty parts of water does not give an orange precipitate with solution of corrosive sublimate.

The only probable impurity is a small quantity of carbonate of soda, which, from imperfect manufacture, has escaped being converted into bicarbonate. Carbonate of soda precipitates sulphate of magnesia; but this is not so delicate a test as the bichloride of mercury, which is precipitated by a much smaller quantity of carbonate than is requisite for decomposing the magnesian salt.

Composition.—Bicarbonate of soda consists of

1 eq. soda, 32; 2 eqs. carbonic acid, 44; 1 eq. water, 9
$= NaO,2CO^2,HO$, eq. 85.

Medicinal properties and uses.—Bicarbonate of soda agrees in general properties and uses with the other carbonated alkalies.

It is preferable to the carbonate of soda when it is to be taken in the state of effervescence, in consequence of the greater amount of carbonic acid; and it may be combined with sulphate of magnesia without occasioning a precipitate; and, when so combined, it almost destroys the offensive flavour of the salt. As bicarbonate of soda is decomposed by hot water, it must always be cold when employed for making a solution. It is often combined with chloride of mercury when administered in the form of powder, and it lessens the tendency of the calomel to cause griping.

Incompatibles.—Acids, and acidulous salts, unless given with the intention of causing effervescence.

Dose.—Gr. x to ʒj. If taken whilst effervescing, ʒj to ʒij, or ʒiij in f℥iv or f℥vi of water; the proportion of acid is as follows: bicarbonate of soda, ʒj; tartaric acid, gr. xviii; or lemon juice, fʒivss. It is a perfectly unnecessary refinement to give citric acid with *sodaic* salts.

SODII CHLORIDUM, *L. D. E.*

CHLORIDE OF SODIUM.

Synonyme. Sodæ Murias, *E.* Sea Salt. Common Salt. Rock Salt. Bay Salt.

Preparation.—This is an article in the Materia Medica, and the Pharmacopœia, therefore, contains no directions for its preparation. It is obtained on the large scale by spontaneous evaporation from sea water, in hot climates, as in France, and even in Hampshire; but still more largely from salt springs, and from salt mines, as at Droitwich, in Warwickshire, and from those in Cheshire.

Description.—There are several forms of common salt, which, however, all agree in general properties.

Rock salt is obtained chiefly from the salt mines in Cheshire. It is in large translucent masses, generally of a reddish-brown colour, owing to the presence of dead salt-water animalculæ.[*] Its most remarkable property is its power of transmitting heat, or its "diathermancy," which is so perfect, as to have led Professor Daniell to term it the "glass" of heat. Rock salt is sometimes obtained in perfectly colourless crystals of great purity.

Bay salt is in large, coarse, generally colourless, grains, and is obtained by *slow* evaporation.

Common grain salt is in large colourless masses, which are easily crushed into a tolerably fine powder, in which there is little or no trace of distinct separate grains or crystals. It is obtained by *quick* evaporation.

Properties.—All these kinds agree in being entirely dissolved by water; and they are equally soluble in this liquid, whether hot or cold, requiring about twice and a half their weight of water for solution; when the solution is carefully evaporated they crystallise in cubes, which are dry, if pure; though they generally attract a little moisture, and become damp when the salt has been obtained from sea water, owing to the presence of a small portion of chloride of magnesium. They decrepitate when heated; and, at a full red heat, are volatilised; and are employed to form a glaze on the interior of earthenware vessels. They are not soluble in alcohol. They have a characteristic flavour, which has given rise to the general term "saline."

[*] M. Marcel de Serres, Chemist, vol. i. p. 105.

Composition. — Chloride of sodium is anhydrous, and consists of 1 eq. sodium, 24; 1 eq. chlorine, 36 = NaCl; eq. 60.

Medicinal properties and uses. — Common salt is so well known as an article of diet as to render any description of it unnecessary. In large quantities (℥j to ℥ij or ℥iij) it acts as an *emetic* or *purgative*, and is sometimes employed as an *anthelmintic*. It is almost as injurious to use too much salt habitually, as too little; and there is no doubt that restriction to salt meat has been a fruitful source of scurvy. The necessity for salt as an article of food seems to increase with the advance from childhood to manhood; and the man desires salt with all his food, whilst the child is indifferent to it, and dislikes it in such quantities as he naturally seeks for, at a later period of life.

Salt is very seldom administered medicinally, but it has been used at different times in the treatment of phthysis, in doses of from ʒss to ʒj, once or oftener in the day, in beef tea or cough mixture. It is said that it produces a variety of good effects, but sometimes causes pulmonary congestion, in which case the dose must be diminished.

A *hot* and *strong* solution of salt is a useful application, as a foot bath, for *chilblains;* and the addition of one or two table-spoonfuls of salt to common water furnishes a substitute for sea water, and is beneficial, when used with considerable friction, in washing the chest, in chronic pulmonary affections, or the abdomen, in habitual constipation or irregularity of the bowels; and it is sometimes beneficially employed as a hip bath in irregular menstruation. The same quantity is often dissolved in a pint of warm water, and thrown into the rectum as a common aperient enema, or for the removal of ascarides.

Dose. — As an emetic or purgative, ℥j to ℥ij, in warm water; as an enema, one or two table-spoonfuls.

SODÆ MURIAS PURUM, *E.*

Purified Muriate of Soda.

Take any convenient quantity of muriate of soda; dissolve it in boiling water; filter the solution, and boil it down over the fire, skimming off the crystals which form; wash the crystals quickly with cold water, and dry them.

Tests. — A solution is not precipitated by solution of carbonate of ammonia, followed by solution of phosphate of soda. A solution of 9 grains in distilled water is not entirely precipitated by a solution of 26 grains of nitrate of silver.

The object of this purification is to get rid of any chloride of magnesium derived from the sea water, which would be shown by the ammonia and phosphate of soda forming a precipitate. If the salt remains dry when exposed to a moderately dry atmosphere, it may be relied upon as pure.

SODÆ PHOSPHAS, *L. D. E.*

PHOSPHATE OF SODA.

Preparation.—There are no directions in the London Pharmacopœia for the preparation of this salt, which is placed by the College in the Materia Medica, as being a substance that may be procured of sufficient purity in ordinary commerce.

Both the Dublin and Edinburgh Colleges give directions, the outline of which is given below.

Take of Bones, burnt to whiteness, ten pounds.
Sulphuric acid, fifty-six (*D.*), forty-four (*E.*), fluid ounces.
Carbonate of soda, twelve pounds (*D.*), or sufficient (*D.E.*).

In the preparation of this salt, bones, burnt to whiteness, are digested for some days with sulphuric acid. Bone earth consists of *phosphate of lime*, which is insoluble; but when acted upon by sulphuric acid, part of the lime combines with it and forms sulphate of lime, leaving the phosphoric acid combined with the remainder of the lime, and forming a *super-phosphate*, which is soluble; this is dissolved in hot water, and carbonate of soda is added to the solution; both salts are decomposed, and *phosphate of soda* and *phosphate of lime* are formed, whilst the carbonic acid escapes; the phosphate of soda is then dissolved in water, and the solution evaporated till crystals begin to form. The presence of a slight excess of carbonate of soda favours the formation of large crystals.

Properties.—Phosphate of soda is transparent when first formed, but very speedily effloresces on exposure to the air, and becomes opaque. It is soluble in four times its weight of cold, or twice its weight of boiling water. It always acts like an alkali upon vegetable colours, rendering turmeric paper brown. The crystals are usually large and flat, the *primary* form of which is an *oblique rhombic prism*. When heated, they lose part of their water of crystallisation, and are converted into pyrophosphate of soda; and on being heated to redness they lose still more, fuse, and form metaphosphate of soda. The *phosphate* is distinguished by yielding a yellow precipitate on the addition of nitrate of silver, which is soluble in nitric acid or ammonia; the *pyrophosphate* yields a *white granular* precipitate with nitrate of silver; and the *metaphosphate* yields a *grey gelatinous* precipitate with the same salt.

Salts for which phosphate of soda may be mistaken. — *Carbonate* or *sulphate of soda.* The crystals are generally thinner and flatter, and want the characteristic diamond shape of the crystals of carbonate of soda, and the more or less six-sided furrowed crystals of the sulphate. If a few drops of any strong acid are added, carbonic acid escapes if the salt is the carbonate, but no such effect is produced if it is phosphate or sulphate. If it is the former, it changes turmeric paper brown, whilst the latter does not alter its colour.

Characters and tests. — It slightly falls to powder when exposed to the air. It is dissolved by water; the solution slightly changes the colour of turmeric to brown; what is thrown down from it by chloride of barium is white, and is dissolved by nitric acid without effervescence; what is precipitated by nitrate of silver is yellow, and is dissolved by the same acid. 100 grains lose 62·3 of water at a red heat. What is thrown down by nitrate of silver from the remaining salt, dissolved in water, is white.

This salt is not liable to be adulterated. The above tests chiefly indicate its character, not its purity.

Composition. — Phosphate of soda is really not a neutral salt, but is a diphosphate, and consists of

2 eqs. of soda, 32 × 2, 64; 1 eq. of water, which is necessary to the existence of the salt, 9; 1 eq. of phosphoric acid, 72; 24 eqs. of water of crystallisation, $216 = (2NaO,HO)PO^5,24HO$; eq. 361.

Considerably more than half its weight, therefore, consists of water.

Medicinal properties and uses. — Phosphate of soda is an exceedingly *mild, unirritating laxative*, and is almost without taste. These properties render it peculiarly suitable for delicate habits, and for children. It may also be given in *inflammatory conditions of the bowels*, in which an aperient is required. It possesses the property of dissolving uric acid, and has been employed, in consequence, in cases where the urine contains too large a proportion of this ingredient.

Uses. — As an aperient, it has been given in rickets, with the view of supplying the phosphoric acid to the system, which is deficient; but experience does not confirm its utility in this disease.

Dose. — ℥ss to ℥jss, in gruel or broth.

SODÆ HYPOSULPHIS. (Not Off.)

Hyposulphite of Soda.

This is manufactured by many different processes, described at considerable length in Gmelin's Handbook of Chem. (Cavend. Ed. vol. iii. p 98.), from which the following is selected.

One pound of pure crystallised carbonate of soda is dried as perfectly as possible, and intimately mixed with 5 ounces of pure sulphur; the mixture is gradually heated in a glass or porcelain vessel to the melting point of the sulphur, and kept at that temperature for some time, stirring constantly, in order to bring every part in contact with the air. The sulphide (sulphuret) of sodium, first formed, absorbs oxygen from the air, and is converted with feeble incandescence into hyposulphite of soda. The mass, when cold, is dissolved in water, and boiled with sulphur for some time; and the filtered solution is afterwards evaporated to the crystallising point.

Characters. — Hyposulphite of soda is in large peculiarly transparent crystals, in which no precisely defined figure can generally be seen. It is readily soluble in both hot and cold water, and the solution, if exposed to the air, deposits sulphur, and is gradually converted into sulphate of soda. Its taste is cooling, and afterwards bitter and sulphurous. When dry, it remains unaltered in the air. It is decomposed by the stronger acids.

Composition. — Hyposulphite of soda consists of

1 eq. soda, 32; 1 eq. hyposulphurous acid, S^2O^2, 48; 5 eqs. water, 45 $= NaO, S^2O^2, 5\ HO$; eq. 125.

Medicinal properties and uses. — This salt, like the next, is called by the modern title of "Parasiticide," which is explained under the article ACID. SULPHUROS. (p. 116.). The hyposulphite has been used by Dr. Neale in *obstinate vomiting*, dependent upon the presence, in the stomach, of the low vegetable growth, the Sarcina Ventriculi.[*] "Vomiting, occasional, for nine years, frequent for three; several times a week. Vomited matters resembled beer grounds, and were very acid, amounting to about one quart daily. He was ordered ten-grain doses of the hyposulphite of soda three times a day. In ten days the vomiting was not so copious, and the dose was increased to fifteen grains. In thirteen days the vomiting was much less, and the vomited matter no longer resembled yest. The treatment was continued about six weeks, after which he only required an occasional aperient of sulphur, and took codliver oil as a general restorative." For internal use Dr. Jenner says that the sulphite of soda is preferable to the hyposulphite, as it is less easily decomposed by the acids of the stomach, and the sulphur is not separated in an uncombined form.[†]

Dose. — For internal use gr. x to gr. xv. As a lotion ʒj dissolved in f℥j of water.

SODÆ SULPHIS. (Not Off.)

SULPHITE OF SODA.

Take any convenient quantity of crystallised carbonate of soda, dissolve it in water, and transmit sulphurous acid through the solution in a Woulfe's apparatus, until the whole of the carbonic acid is expelled. Then evaporate the solution out of contact of air.

Decomposition. — In this case the sulphurous acid simply displaces the carbonic acid, and a solution of sulphite of soda is the result.

Characters. — This salt is in transparent, colourless, flattened crystals, soluble in four parts of cold water, and less than its own weight of boiling water. It gradually absorbs oxygen from the air, and is converted into sulphate of soda. Its taste is at first fresh, but afterwards sulphurous. It restores the blue colour of reddened litmus paper.

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[*] Braith. Retrosp. vol. xxviii. p. 131.

[†] Ibid. p. 296.

Composition. — Sulphite of soda consists of

1 eq. soda, 32 ; 1 eq. sulphurous acid, 32 ; 8 or 10 eqs. water, 72 or 90=$NaO, SO^2, 8HO$; eq. 136; or $NaO, SO^2, 10HO$; eq. 154.*

Medicinal properties. — There is no well-known name by which to describe them, but the newly-invented title of "Parasiticide" has been bestowed upon them. (For a detailed account of the medicinal properties of sulphurous acid, which is the important ingredient in this compound, see Acid. Sulphurosum, p. 116.)

Uses. — Sulphite of soda has been employed in solution in some obstinate cases of *tinea capitis*, and also in *thrush*. (See Acid. Sulph. *Uses*, p. 116.)

Dose. — For *internal administration* gr. x, increased to gr. xv three times a day. As a *lotion* ʒj is dissolved in f℥j of water. (Jenner, *Braith. Retrosp.* vol. xxviii. p. 296.)

SODÆ SULPHAS, *L. D. E.*

Sulphate of Soda.

Synonyme. Glauber's Salt. Natron Vitriolatum.

The Edinburgh College is the only one which gives directions for making this salt; the others having placed it in the Materia Medica.

Take of the Salt which remains after preparing pure muriatic acid, two pounds.
Boiling water, three pints.
White marble, in powder, a sufficiency.

Dissolve the salt in the water; add the marble so long as effervescence takes place; boil the liquid; when neutral, filter it; wash the insoluble matter with boiling water, adding the water to the original liquid; concentrate till a pellicle begins to form, and then let the liquid cool and crystallise.

Process. — In preparing hydrochloric acid, sulphate of soda is formed with excess of sulphuric acid. (See Acid. Hydrochloric.) The excess of acid is not large, and a small quantity of marble is sufficient to neutralise it. The sulphate of lime which is formed is removed by filtration, and the remaining neutral sulphate of soda is obtained, in a crystalline form, by evaporation.

Properties. — Sulphate of soda, or Glauber's salt, is very efflorescent, and almost always appears partially covered with an opaque white powder. It is very soluble in water, 100 parts of which dissolve nearly 300 parts of the salt at 91° F.; it is remarkable that it is less soluble above this temperature, and if a saturated solution at 91° F. is heated to the boiling point, a portion of the salt is deposited. It is insoluble in alcohol.

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* Gmelin's Chem. (Cavend. Soc.) vol. iii. p. 99., from which the above account is taken.

The *primary form* of the crystals is a rhombic octahedron (*Turner*), oblique rhombic prism (*Phillips*); but, as generally seen, the crystals are four or six-sided channelled prisms, about half an inch thick. They are very seldom translucent, for the slightest exposure to the air is sufficient to cover them with a white powder; and if long exposed, they lose their crystalline form altogether, and fall into a light white powder. They melt, when heated in their own water of crystallisation, and at a red heat fuse without undergoing decomposition.

Composition.—Sulphate of soda consists of

1 eq. soda, 32; 1 eq. sulphuric acid, 40; 10 eqs. water, 9 × 10, 90 $= NaO,SO^3,10HO$; eq. 162.

More than half its weight is therefore water.

Characters and tests.—It falls to powder on exposure to the air. It is dissolved by water; the solution changes the colour of neither litmus nor turmeric: from the diluted solution scarcely anything is thrown down by nitrate of silver. 100 grains lose 55·5 of water in a hot fire; moreover, from 100 grains dissolved in distilled water, chloride of barium and hydrochloric acid being added, 71 grains of sulphate of barytes are obtained, when dried by a hot fire.

This salt is not liable to be adulterated, and the above tests are more important for indicating its nature than its purity.

Salts for which sulphate of soda may be mistaken.—*Carbonate or phosphate of soda.* It is distinguished from both by the length of the crystals, and by their being four or six-sided; whilst the other salts are flattened, and have their characteristic forms. Its *bitter* taste would also distinguish it, and its producing no effect upon turmeric paper.

Medicinal properties.—*Purgative.*

Characteristic properties.—Very *bitter* taste, but not so *nauseous* as sulphate of magnesia, and not quite so active. It is a cooling purgative, and causes watery stools by its action upon the exhalants of the mucous membrane, but it does not excite or increase inflammation of the alimentary mucous membranes. Its bitter taste may be disguised by the addition of lemon juice, or of bitartrate of potash.

Uses.—*Fevers and inflammatory affections.* During the last century it was the common aperient for all the cases in which sulphate of magnesia is now employed; and there does not appear to be any very good reason for its present general disuse.

Dose.—℥ss to ℥ij.

Incompatibles.—Carbonate of potash, if the solution is strong; if moderately dilute, they may be prescribed together.

SODÆ POTASSIO-TARTRAS, *L. D. E.*

POTASSIO-TARTRATE OF SODA.

Synonyme. Sodæ et Potassæ Tartras, *D.* Potassæ et Sodæ Tartras, *E.* Natron Tartarizatum. Soda Tartarizata. Rochelle Salt.

The London College does not give any directions for making this salt. The Dublin and Edinburgh Colleges order the same proportions of the ingredients, and the directions are also closely alike.

Take of Bitartrate of potash, powdered, sixteen ounces.
Carbonate of soda, twelve ounces.
Water, boiling, four pints.

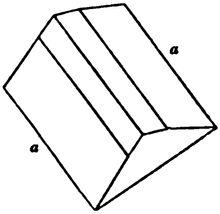
Dissolve the carbonate of soda in the boiling water, and add, gradually, the bitartrate of potash, till the solution is neutral; strain the liquor; then apply a gentle heat, until a pellicle floats, and set it aside that crystals may be formed after twelve hours; the liquor being poured off, dry them on blotting-paper; evaporate the liquor again that it may yield crystals.

Preparation.—Bitartrate of potash is very slightly soluble in water, and consists of one equivalent of potash and two equivalents of tartaric acid; when carbonate of soda is added to it, the second equivalent of tartaric acid combines with the soda, and the carbonic acid escapes as gas: the solution of tartrate of potash and tartrate of soda is then evaporated, and the crystals which are obtained are the potassio-tartrate of soda.

Materials.			Results.
1 eq. carbonate of soda	1 eq. carbonic acid		1 eq. carbonic acid ƒ.
	1 eq. soda	1 eq. tartrate of soda	1 eq. potassio-tartrate of soda.
1 eq. bitartrate of potash	1 eq. tartaric acid		
	1 eq. tartaric acid	1 eq. tartrate of potash	
	1 eq. potash		

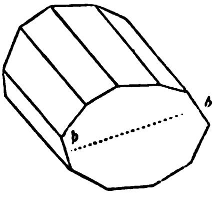
Properties.—Potassio-tartrate of soda crystallises in beautiful, large, transparent crystals, which possess a very characteristic appearance. The *primary form* is a *right rhombic prism*, but their *usual figure* is that represented in *fig.* 1. Sometimes they resemble *fig.* 2., which may be supposed to consist of two crystals of the former shape, applied base to base, and having the edges, *a*, *a*, replaced by flattened sides, *b*, *b*.

Fig. 1.



This salt is not affected by the air, but is readily dissolved by a small quantity of water; in which respect it differs from its principal constituent, the bitartrate of potash. It is dissolved by five parts of water at 60° F., and by a smaller quantity of boiling water.

Fig. 2.



Composition.—Potassio-tartrate of soda consists of

1 eq. tartrate of soda	$NaO, 32+\bar{T}, 66$	= 98
1 eq. tartrate of potash	$KO, 48+\bar{T}, 66$	= 114
8 eqs. water	$8HO,$	= 72
	$KO,\bar{T},NaO,\bar{T},8HO$; eq.	284

Characters and tests.—It is dissolved by (5 parts, *E.*) water; the solution does not change the colour of litmus, or turmeric; sulphuric (muriatic, *E.*) acid being added, bitartrate of potash is thrown down (as a crystalline precipitate, *E.*); nothing is precipitated when nitrate of silver or chloride of barium is added, but what is again dissolved on the addition of water.

E. 37 grains in solution are not entirely precipitated by 43 grains of nitrate of lead.

It is not liable to adulteration when in the crystalline form.

Salts for which potassio-tartrate of soda may be mistaken.—None.

Medicinal properties.—Mild, cooling *laxative.* If given alone, it is, like most of the saline purgatives, liable to occasion flatulence and griping. It is generally taken in combination with infusion of senna, the ginger in which corrects its griping qualities. It is frequently administered in a state of effervescence, with bicarbonate of soda and tartaric acid, under the title of Seidlitz powder. Its acid is decomposed when taken into the stomach, and its alkaline constituents produce an alkaline effect upon the urine, in which they may be detected; hence this salt should be avoided in cases of phosphatic deposits in the urine, whilst it is a useful aperient when there is excessive formation of lithic acid.

Characteristics as a purgative.—Mild; exerts an alkaline influence upon the urine; does not excite or increase inflammatory action of the alimentary mucous membrane.

Uses.—Delicate females and children. It may be given in inflammatory affections of the bowels, as it does not increase this condition.

Incompatibles.—Acids.

Dose.—ʒij to ℥j in any suitable vehicle.

SODÆ AQUA EFFERVESCENS, *E.*

EFFERVESCING SOLUTION OF SODA.

Take of Bicarbonate of soda, one drachm.
Water, a pint.

Dissolve the bicarbonate in the water, and saturate it with carbonic acid, under strong pressure. Preserve the liquid in well-closed vessels.

Remarks.—This solution is an officinal form of soda-water. The additional quantity of carbonic acid removes the disagreeable alkaline flavour of the soda, and renders it more grateful to the stomach, while it does not diminish its powers.

Uses.—Those of carbonated alkalies generally. It is a popular remedy for the dyspepsia occasioned by an excess in wine or spirits.

LIQUOR SODÆ CHLORINATÆ, *L.D.*

SOLUTION OF CHLORINATED SODA.

Synonyme. Chloride of Soda. Labarraque's Disinfecting Solution of Soda.

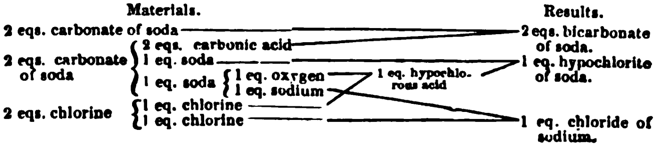
Take of Carbonate of soda, a pound.
Distilled water, forty-eight fluid ounces.
Chloride of sodium, four ounces.
Binoxide of manganese, three ounces.
Sulphuric acid, two fluid ounces and a half.

Dissolve the carbonate in two pints of the water; then put the chloride and binoxide, rubbed to powder, into a retort, and add to them the sulphuric acid, previously mixed with three fluid ounces of the water and cooled; heat the mixture, and pass the chlorine first through five fluid ounces of the water, and afterwards into the solution of carbonate above directed.

D. Take of chlorinated lime, ℔ss; Water, cong. ss; Crystals of carbonate of soda, ℥vii. Rub the lime well together with three pints of water, and then shake them well together in a bottle for three hours; strain, and add the carbonate of soda, dissolved in the remainder of the water, to the clear solution; having stirred the mixture well for ten minutes, separate the liquid by a second filtration, and preserve it in a well-stopped bottle. Sp. gr. 1·034.

Process.—The changes which take place when chloride of sodium, sulphuric acid, and binoxide of manganese act upon each other have been already fully explained. (See CALX CHLORINATA, p. 435.)

The chlorine which is evolved is passed into the solution of carbonate of soda, by which it is largely absorbed, and causes the formation of three salts: chloride of sodium, bicarbonate of soda, and hypochlorite of soda. The following diagram, taken from Pereira's Materia Medica, illustrates these changes:—



These views are still somewhat conjectural, as chemists are not yet agreed upon the positive existence of hypochlorous acid.

By the Dublin method the soluble portion of the chloride of lime, which contains all or nearly all the chlorine, is dissolved, and after being cleared by filtration, is mixed with the carbonate of soda, when carbonate of lime is formed and precipitated, and chloride of soda remains in solution.

Properties.—Chlorinated soda is a nearly colourless solution, and possesses the usual odour of chlorine; it bleaches vegetable colours, and destroys the colour of solution of indigo. It slowly decomposes when exposed to the air, and evolves chlorine.

Composition. — This is not certainly known. It contains chlorine, bicarbonate of soda, and chloride of sodium. It is, by some chemists, supposed to consist of bicarbonate of soda, chloride of sodium, and hypochlorite of soda; but, by others, of chloride of soda and bicarbonate of soda.

Characters and tests.—The colour of turmeric is at first changed to brown, when added to this solution, and, soon after, entirely disappears; dilute hydrochloric acid being added, carbonic acid and chlorine are emitted together. Solution of sulphate of indigo is bleached by it; lime is thrown down from lime-water by it.

The tests indicate the properties, but not the purity of the solution. The only imperfection to which it is liable is a deficiency in the amount of chlorine.

Medicinal properties and uses.—Chlorinated soda is chiefly employed externally as a lotion to foul ulcers; but it is sometimes very usefully administered internally also. In low *fever* it clears the tongue, promotes the secretion of sweat and urine, corrects the horribly offensive state of the evacuations, and, at the same time, appears to rouse the patient; and in the *mesenteric affections of children*, with diarrhœa and offensive stools, I have found it highly serviceable in doses of ♏v to ♏x; it may be combined, in these cases, with catechu or rhubarb, according to the state of the patient. It is often used as a gargle in ulcerated sore throat, and as a wash to the mouth, to check profuse salivation; and sometimes as an injection, when there is offensive discharge from the vagina or bladder. It is employed locally in many skin diseases, as itch, porrigo, and eczema; and is also used as a fumigating or disinfecting agent to correct the effluvia of sick chambers, but being much more expensive than chloride of lime, and not more efficacious for this last-mentioned purpose, it is not often employed in this way.

Dose and administration.—*Internally*, ♏x to ♏xxx, in simple water or toast-water. As a *gargle*, diluted with fifteen times its weight of water. As a *lotion*, rather stronger; sometimes (for checking the spread of ulceration), with only an equal weight of water. As an *injection*, it should be diluted with ten or fifteen times this quantity.

Incompatibles.—Chiefly acids, and acidulous and metallic salts; coloured syrups ought never to be added, as it quickly bleaches them.

SODÆ VALERIANAS, *D.*

VALERIANATE OF SODA.

Take of Bichromate of potash, reduced to powder, nine ounces.
Fusel oil, four fluid ounces.
Oil of vitriol, of commerce, six fluid ounces and a half.
Water, half a gallon.
Solution of caustic soda, a pint or sufficient.

Dilute the oil of vitriol with ten ounces, and dissolve, with the aid of heat, the bichromate of potash in the remainder of the water; when both solutions have cooled down to nearly the temperature of the atmosphere, place them in a matrass, and, having added the fusel oil, mix well by repeated shaking until the temperature of the mixture, which first rises to above 150°, has fallen to 80° or 90°; the matrass having been now connected with a condenser, heat is to be applied, so as to distil over about half a gallon of liquid; let this, when exactly saturated with the solution of caustic soda, be separated from a little oil that floats on its surface, and evaporated down until, the escape of aqueous vapour having entirely ceased, the residual salt is partially liquefied; the heat should be now withdrawn, and when the valerianate of soda has concreted, it is, while still warm, to be divided into fragments and preserved in a well-stopped bottle.

Process.—The object of this process is to convert the fusel oil into valerianic acid, which is then to be neutralised by the soda, and the solution of valerianate of soda thus obtained, is to be evaporated until the salt is obtained dry.

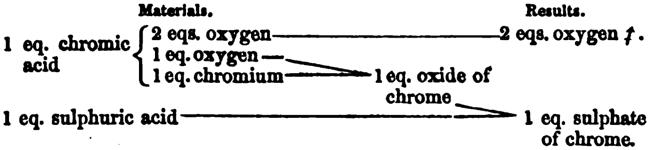
Fusel oil differs from valerianic acid in the proportions of hydrogen and oxygen which it contains.

	C.	H.	O.
Fusel oil - -	10	11	0
Valerianic acid -	10	9	3

If, then, five eqs. of oxygen be combined with fusel oil it will be converted into valerianic acid and water; thus,

$$\begin{array}{lccc} & \text{C.} & \text{H.} & \text{O.} \\ \text{1 eq. fusel oil} & 10 & 11 & 0 \\ \text{5 eqs. oxygen} & & & 5 \\ \hline & 10 & 11 & 5 \end{array} \left.\vphantom{\begin{array}{c}a\\b\end{array}}\right\} = \left\{\vphantom{\begin{array}{c}a\\b\end{array}}\right. \begin{array}{lccc} & \text{C.} & \text{H.} & \text{O.} \\ \text{1 eq. valerianic acid} & 10 & 9 & 3 \\ \text{2 eqs. water -} & 0 & 2 & 2 \\ \hline & 10 & 11 & 5 \end{array}$$

The object is, therefore, to obtain oxygen in such a form as will combine with the fusel oil to produce this change, an object which is attained by the action of sulphuric acid upon bichromate of potash. This salt consists of potash and chromic acid, which is composed of 1 eq. of chromium and 3 eqs. of oxygen. When it is heated along with sulphuric acid it is decomposed, and two equivalents of oxygen escape, leaving oxide of chromium, which combines with the acid and forms sulphate of chrome; the potash, also, is removed by another portion of sulphuric acid. The following diagram only refers to the change in the chromic acid:—



But, at the instant of their separation, or whilst in their "nascent state," many gases are capable of combining with bodies with which they would not combine after they had fairly assumed the gaseous form, and this property belongs to oxygen amongst others. Accordingly, the fusel oil is put into the matrass or retort along with the bichromate of potash and sulphuric acid, and, at the moment at which the oxygen is liberated, it combines with the oil, forming water with a portion of its hydrogen, and valerianic acid with the remainder of its constituents; which acid being volatile is then distilled, and afterwards neutralised by caustic soda, and then valerianate of soda is obtained by evaporation.

Chemical properties.—Valerianate of soda is not often to be obtained in a crystalline form, as it differs from all the compounds of soda in being deliquescent instead of efflorescent. It forms a white solid mass, which quickly becomes pasty from the absorption of water; in which fluid it is easily soluble, either hot or cold. It has a strong odour of valerian. When dissolved in water there is no film of oil formed upon the surface.

Chemical properties of valerianic acid.—See COMPOUND TINCTURE OF VALERIAN.

Medicinal properties.—For the properties of valerianic acid, see TINCT. VALER. CO. The valerianate of soda is not administered internally, and is only used in the formation of valerianate of quinine, iron, and zinc, which are employed medicinally.

PRÆPARATUM E STANNO.

PREPARATION OF TIN.

STANNUM.

TIN. *Symb.* Sn. Eq. 58. Sp. gr. 7·9.

Tin is a white, silvery, crystalline, brittle metal. It fuses at 442° F., and, when melted, can easily be powdered as it is becoming solid, by shaking it in a box with a little chalk.

STANNI PULVIS, *D.E.*

POWDERED TIN.

The Edinburgh College orders the tin, whilst melted, to be diligently stirred in a mortar heated rather hotter than the fusing point of the metal. It is afterwards to be passed through a fine sieve. The Dublin College directs it to be stirred up in the crucible by an iron rod, whilst solidifying after being melted.

Properties and uses. — Tin, in the mass, does not possess any medicinal properties; but, when finely divided, it is used as an *anthelmintic* to remove tape-worms; the mode of its action is uncertain, some persons supposing that it mechanically dislodges the worms, and others, that it kills them by the gases evolved during its passage through the intestines; it is very inferior in efficacy to turpentine, and is seldom used. It should always be followed by a purgative.

Dose. — ʒij to ℥j, mixed with treacle.

PRÆPARATA E ZINCO.

PREPARATIONS OF ZINC.

ZINCUM.

ZINC. *Symb.* Zn. Eq. 32.

Synonyme. Spelter.

Remarks. — Zinc is a bluish-white metal; sp. gr. *about* 7; crystalline and brittle at ordinary temperatures, but malleable when heated to 300° F. It oxidises very slowly in the air under common circumstances, but when heated to about 800° F. in open vessels, it absorbs oxygen rapidly, and burns with a beautiful bluish-white flame, forming a feathery white oxide. When heated in close vessels it sublimes unchanged. It is rapidly oxidised and dissolved by dilute acids, and all its soluble salts possess active medicinal properties. It has been employed for making basins in which to keep milk, but this liquid rapidly dissolves a portion of the metal, which may be readily detected by tests. I placed a small piece of zinc in a cup of milk for twelve hours during a warm spring day, at the end of which time both ammonia and hydrosulphuric acid threw down precipitates of zinc; another piece was kept in milk for thirty-six hours, in cold weather, with the same result.

Characters and tests.—Its sp. gr. is 6·86. It is dissolved by nitric acid; what is thrown down by ammonia is redissolved by it when added in excess.

E. It dissolves in a great measure in diluted sulphuric acid, leaving only a scanty greyish-black residuum.

The residuum consists of a minute portion of lead, copper, iron, cadmium, sulphur, manganese, and plumbago, which are sometimes present in commercial zinc. A minute quantity of arsenic also is occasionally present, but it is carried off by the hydrogen, in which it may be detected by Marsh's test. (See Arsenious Acid, *Tests*, p. 415.) Commercial zinc is now, however, very nearly pure.

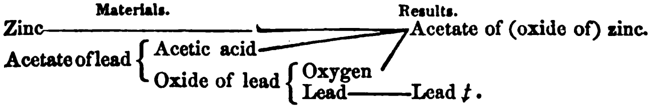
ZINCI ACETAS, *D.*

Acetate of Zinc.

Take of Acetate of lead, one pound.
Sheet zinc, four ounces.
Distilled water, two pints and a half.
Solution of chlorinated lime, a sufficient quantity.

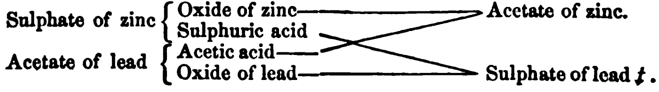
Dissolve the acetate of lead in the water, and having placed the solution in a cylindrical jar, immerse in it the zinc, rolled into a coil. After the lapse of twenty-four hours decant the liquid, and having reduced it by evaporation to fifteen ounces, drop into it, while boiling hot, the solution of chlorinated lime, until a reddish precipitate ceases to form. Filter, acidulate with a few drops of acetic acid, and evaporate to ten ounces; on cooling, crystals will form, which are to be dried on a porous brick.

Process.—This is a case of "simple elective affinity," the oxygen and acetic acid leaving the lead to combine with the zinc, and form acetate of zinc, whilst the lead is set free in the metallic form.



This acetate of zinc sometimes contains a little iron, from the presence of a small quantity in the zinc employed; it is separated as peroxide on the addition of the chlorinated lime, and is removed by filtration.

Acetate of zinc is often prepared *extempore* by mixing together acetate of lead and sulphate of zinc in lotions; the sulphuric acid combines with the oxide of lead and forms sulphate of lead, which is a white precipitate; and the acetic acid leaves the salt of lead to combine with the oxide of zinc, and form acetate of zinc, which remains in solution.



Description.—Acetate of zinc is in small, colourless crystals which are readily soluble in water. They can only be distinguished by tests.

They do not change the colour of turmeric; they produce a *white* precipitate with prussiate of potash, and a *white* one also with sulphuretted hydrogen.

Composition.—Acetate of zinc consists of

1 eq. oxide of zinc, 40; 1 eq. acetic acid, 51 = ZnO,A; eq. 91, combined with 7 eqs. or 3 eqs. of water (*Brande*).

Medicinal properties and uses.—Acetate of zinc is only used externally, in the form of lotions or injections. It is less irritating than the sulphate, when used as an injection in gonorrhœa or gleet, and when intended for this purpose it is often prepared extempore, as in the diagram last given, by adding one or two drachms of sulphate of zinc to an equal quantity of solution of acetate of lead in eight ounces of water. It is sometimes used as an eye-water in chronic inflammation of the conjunctiva; in this case the pure acetate of zinc should be employed at once, or, if prepared as above, the collyrium ought to be filtered, lest any of the precipitated sulphate of lead should enter the eye and prove a source of irritation. It is also employed as an astringent lotion to suppurating sores.

Dose.—Acetate of zinc is not given internally. For lotions for the purposes above mentioned, gr. iv to ℈j in the ounce of water, *i. e.* ʒss to ʒjss in an eight ounce lotion, may be employed, according to the object in view and the effects produced.

ZINCI CARBONAS, *D.*

CARBONATE OF ZINC.

Take of Solution of chloride of zinc, one pint.
Crystallised carbonate of soda of commerce, two pounds.
Boiling distilled water, six pints.

To the carbonate of soda, dissolved in the water, add the solution of chloride of zinc in successive portions, and boil until gas ceases to be evolved; collect the precipitate on a calico filter, and having poured on distilled water until the washings cease to cause turbidity when dropped into a solution of nitrate of silver containing free nitric acid, dry the product, first on blotting-paper placed on a porous brick, and finally by a steam or water heat.

Properties and uses.—The same as those of zinci oxydum, which see, p. 618.

ZINCI CHLORIDUM, *L. D.*

CHLORIDE OF ZINC.

Synonyme. Butter of Zinc.

Take of Hydrochloric acid, a pint.
Distilled water, two pints.
Granulated zinc, seven ounces.

Mix the acid with the water, and add the zinc to them, and when the effervescence is nearly finished, apply heat until bubbles cease to escape; pour off the solution, filter, and evaporate until the salt remains dry; when this is melted at nearly a red heat in a lightly covered crucible, pour it upon a flat smooth stone; lastly, when it has cooled, break it in pieces and keep them in a well-closed vessel.

D. Take of solution of chloride of zinc any convenient quantity. Evaporate it down in a porcelain crucible so far that, upon suffering the residual liquor to cool, it solidifies. Subdivide the product rapidly into fragments and enclose them in a well-stopped bottle.

Process.— When hydrochloric acid is poured upon zinc, it is decomposed, the chlorine combining with the metal to form chloride of zinc, and the hydrogen escaping as gas.

Materials.		Results.
Hydrochloric acid	Hydrogen	Hydrogen ↑.
	Chlorine	
Zinc		Chloride of zinc.

This chloride is then evaporated to dryness, but it is so extremely deliquescent as to require a high temperature before it is perfectly dry; the heat must, however, be a little below redness, as, at a full red heat, the chloride is volatilised; it is then to be suddenly solidified by being poured upon a cold smooth stone, and is to be broken in pieces before it has had time to absorb moisture from the air.

Characters and tests.—Colourless; it liquefies in the air; it is dissolved by rectified spirit and by water; from this water a white precipitate is thrown down on the addition of hydrosulphuric acid, or of ferrocyanide of potassium; what is thrown down from it by ammonia or potash is white, and is redissolved on the addition of either in excess; moreover, what is precipitated on the addition of carbonate of ammonia or potash is white, but is not dissolved when they are added in excess.

Medicinal properties and uses.—It is only used as a *caustic* for the entire destruction of cancerous surfaces. It is one of the most powerful of this class of agents, and causes intense pain. It may be applied to the part by being rubbed on, or may be made into a paste with lard or three or four parts of flour. It is so deliquescent that care is requisite to prevent its spreading beyond the desired limits.

ZINCI CHLORIDI LIQUOR, *D.*

SOLUTION OF CHLORIDE OF ZINC.

Take of Sheet zinc, one pound.
Muriatic acid of commerce,
Water, of each, two pints and a half, or sufficient.
Solution of chlorinated lime, one fluid ounce.
Prepared chalk, one ounce.

Add the zinc to the acid, applying heat till it is dissolved; filter through calico; add the solution of chlorinated lime, and concentrate, at a boiling temperature, down to a pint. Let the solution cool; add distilled water to make up a quart, and then add the chalk; shake the mixture occasionally for twenty-four hours. Finally, filter, and preserve in a well-stopped bottle. Sp. gr. 1·593.

BURNETT'S DISINFECTING SOLUTION OF CHLORIDE OF ZINC.

Though this is not officinal, it has been so far pushed upon the medical profession by the circular of the Poor Law Board directing it to be used by poor law medical officers, that it deserves more notice than it would otherwise receive. It is a solution containing 25 grs. of zinc in every fluid drachm.* In the first edition of this work, it was stated to be a solution of one pound of chloride of zinc, in five gallons of water; which is very much below its real strength. The mistake arose from having copied the following paragraph from another portion of the same journal. "The solution is made by dissolving one pound of chloride of zinc in five gallons of water; and the substance to be preserved is immersed in this solution for a period varying from 48 to 96 hours." † The solution intended in this last sentence is what is of a suitable strength for use, and it was mistaken for the liquor zinci chloridi itself, which is of the strength first mentioned above. A patent was taken out by Sir W. Burnett for employing it to preserve wood, clothes, &c. After some years, its application to disinfecting purposes suggested itself and was adopted, but it does not form part of the patent; and any chemist is therefore at liberty to prepare a similar solution to be used for disinfecting purposes.‡

Properties.— This solution is colourless, and has a high sp. gr., double that of water. It is free from odour, and is recommended for the purpose of removing offensive smells from sick rooms, &c.; when mixed with about forty parts of water, it is to be sprinkled in the room to be sweetened, and testimony, hitherto, is favourable to its claims. In my experience it has seldom failed to remove the offensive odour from night-stools, and very materially to diminish that from cancerous sores; it has done this much more efficiently than chloride of lime, and it has the advantage of being free from any unpleasant odour itself. I have also found that, when much diluted, it has removed the odour from the hands after *post-mortem* examinations. As an *antiseptic*, it has proved very efficient in preserving anatomical preparations, which remain as clean and natural in their appearance as when kept in spirit, if not more so.

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* Pharm. Jour. vol. vii. Aug. 1847, p. 63.

† Ibid. p. 60.

‡ Ibid. p. 63

SYRUPUS ZINCI IODIDI. (Not Off.)

Syrup of Iodide of Zinc.

This preparation has been introduced into practice by Dr. Barlow at Guy's Hospital in the treatment of chorea and strumous skin diseases. There is no officinal preparation; but that employed by Dr. Barlow contains three grains of iodide of zinc in every fluid drachm of the syrup. The iodide is a very deliquescent salt, and cannot be preserved free from moisture, and on this account, it is, that it is made into a syrup. It may be prepared, like the syrup of iodide of iron by simply heating together granulated zinc and iodine with a little water.

Take of Pure granulated zinc, ℥ss; Iodine, ʒviss; Distilled water, f℥x.

Introduce the materials into a flask, and heat them, at first gently, and afterwards boil them briskly until the deep colour of the iodine disappears, occasionally adding water if necessary. Then filter the clear solution into a vessel containing one pint of simple syrup, and evaporate the mixture until it measures a pint.

Process.— The above is a case of simple combination, the iodine combining with the zinc to form iodide of zinc, which is then dissolved in the water. A considerable excess of zinc is employed, which remains undissolved in the flask. I have been favoured with the following formula by Mr. Davenport, who has prepared it for Dr. Barlow. Take of Iodide of zinc, ℥j; Water, f℥xii; White sugar, ℥xvi. Dissolve the iodide in the water and add the sugar, and evaporate by a water-bath to f℥xx.

Composition.— Iodide of zinc consists of

1 eq. iodine 126; 1 eq. zinc, 32=Zn I. eq. 158.

The syrup made in either way contains gr. iij. in every fʒj.

Medicinal properties and uses.— I shall describe these in Dr. Barlow's own words, which will carry additional weight with all who know his careful observation and judicious inferences.

"I have found it of great service in three cases of strumous inflammation of the skin, in a case of chorea in which I suspected a tendency to chronic strumous meningitis, and in one case of chorea in a delicate lad, in whom the disease had resisted sulphate of zinc. I have nothing as yet very decisive to say of other cures, but believe that it will prove a useful addition to our Materia Medica.

"I have generally begun with ♏xx — xxx of the syrup. zinc. iodid., and increased it to fʒj, fʒjss, or even fʒij. I have never found emetic effects, but it is not unlikely that such would ensue were the dose large; but I have had some complaints of heat in the epigastrium, which I referred to irritation of the gastric mucous membrane, and when it occurred I have always either diminished the dose or withdrawn the medicine.

Dose.— ♏xx or ♏xxx at first, gradually increased to fʒj or even fʒij. One fluid drachm contains three grains.

ZINCI OXYDUM, *L. D. E.*

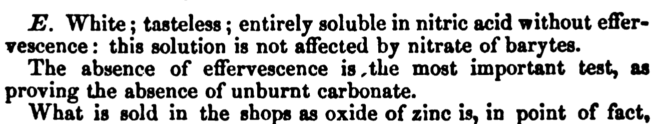
Oxide of Zinc.

Synonyme. Zincum Calcinatum.

Take of Sulphate of zinc, a pound.
Sesquicarb. of ammonia, six ounces and a half.
Distilled water, three gallons.

Dissolve the sulphate and sesquicarbonate, separately, in twelve pints of the distilled water, and strain; then mix; wash what is precipitated frequently with water; and, lastly, burn it for two hours in a strong fire (in a very low red heat, until it ceases to effervesce when dropped into dilute sulphuric acid, *D.*).

Process.—When sesquicarbonate of ammonia is added to a solution of sulphate of zinc, double decomposition ensues; carbonate of zinc and sulphate of ammonia are formed, and part of the carbonic acid from the ammonia escapes as gas. When this carbonate of zinc is exposed to a high temperature, the carbonic acid is driven off, and oxide of zinc remains.



Characters and tests.— In powder; yellowish-white; it is dissolved by ammonia, potash, or hydrochloric acid.

E. White; tasteless; entirely soluble in nitric acid without effervescence: this solution is not affected by nitrate of barytes.

The absence of effervescence is the most important test, as proving the absence of unburnt carbonate.

What is sold in the shops as oxide of zinc is, in point of fact, carbonate; for this is perfectly white and smooth, whilst, after being burnt, the oxide has a brownish appearance, and is not so smooth. The reason for this substitution is, that the carbonate is a more profitable article than the oxide, as it contains twenty-two parts of gas in every sixty-two parts by weight, which would be lost if driven off by being burnt; independent of the fact that the oxide, not being so elegant a preparation as the carbonate, might be thought to be an inferior one. It is probable that this error is of little consequence, as oxide of zinc is seldom prescribed internally, and it is of little importance as regards its external uses.

Medicinal properties.—Tonic. Oxide of zinc agrees with the sulphate in its general properties, being dissolved by the fluids of the stomach, and converted into a soluble salt; but it is very seldom prescribed, as most of its effects can be obtained with greater certainty from the sulphate. Externally applied, it is a good absorbent powder.

Uses.—Internally, in *chorea* and *epilepsy*. Externally, it is applied to sore nipples, and to large suppurating languid ulcers; and, in the form of ointment, to ringworm of the scalp, to impetiginous eruptions, and to the eyelids in ophthalmia tarsi. Dr. Dickson has observed the benefit derived from the use of this oxide in the *night sweats of phthysis;* and Dr. T. Thompson says, "No remedy that I have yet employed has exercised so uniformly favourable an effect in moderating the night perspirations when used in doses of gr. iv with gr. iv of ext. hyosciami."—(*On Pulmonary Consumption*, 1854, p. 193.)

Dose.—Of the powder, gr. ij to gr. viii, in the form of pills.

Officinal preparations.—Unguentum Zinci, *L. E.* (Oxydi, *D.*).

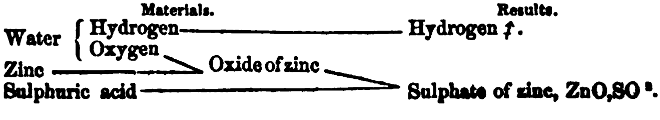
ZINCI SULPHAS, *L. D. E.*

Sulphate of Zinc.

Synonyme. White Vitriol.

This salt is now placed in the Materia Medica by the London College; but the following is the plan adopted when the ordinary sulphate of commerce is not perfectly pure. The only probable impurity is a little iron, and this is removed by being converted into peroxide, which, being insoluble, is precipitated and separated by filtration. If the solution of sulphate of zinc is boiled for a few minutes with half a drachm or a drachm of nitric acid, the iron is converted into peroxide; or, if the solution is simply evaporated and redissolved several times, the same effect is produced by the long-continued exposure to the air, and the zinc salt is thus left pure. The sulphate is prepared in the first instance by dissolving zinc in dilute sulphuric acid.

Process.—When zinc is placed in dilute sulphuric acid, the water is decomposed; its oxygen combines with the metal, forming oxide of zinc, with which the acid unites to form sulphate of oxide of zinc, commonly called, simply, sulphate of zinc; and, at the same time, the hydrogen escapes as gas.



According to the new theory, the sulphatoxide of hydrogen is simply decomposed, the sulphatoxygen combining with the zinc, and the hydrogen escaping. (See SALTS, *Constitution*, p. 388.)

Materials.		Results.
Sulphatoxide of hydrogen	Hydrogen ———	Hydrogen ↑.
	Sulphatoxygen ———	
Zinc ———		Sulphatoxide of zinc, Zn,SO^4.

Description.—Sulphate of zinc is in small colourless crystals which have a styptic but not disagreeable taste, nearly resembling that of alum; they are soluble in two and a half times their weight of water at 60° F., and are much more soluble at a higher temperature. The *primary* form of the crystals is a *right rhombic prism*; but, as usually seen, they are so small as to render it difficult to detect any regular figure.

Composition.—Sulphate of zinc consists of

1 eq. oxide of zinc, 32+8; 1 eq. sulphuric acid, 40; 7 eqs. water, $9 \times 7, 63 = ZnO,SO^3,7HO$; eq. 143.

Or, if termed sulphatoxide of zinc, it consists of

1 eq. zinc, 32; 1 eq. sulphatoxygen, 48; 7 eqs. water, 63 $= Zn,SO^4,7HO$; eq. 143.

Characters and tests.—It is dissolved by water; what is thrown down by ammonia is white, and is redissolved when this is added in excess; what is thrown down by chloride of barium or by acetate of lead is not dissolved by dilute nitric acid; what is precipitated by sesquicarbonate of ammonia from 100 grains dissolved in water, is reduced to 27·9 grains of oxide of zinc by a hot fire.

E. When a solution in six waters is boiled with a little nitric acid, and solution of ammonia is then added till the oxide of zinc first thrown down is all redissolved, no yellow precipitate remains, or a trace only, and the solution is colourless.

The London tests only indicate the nature of the salt. The Edinburgh tests prove the absence of sulphate of iron, the only probable impurity, and which, if present, is always accidental, not fraudulent. Sulphuretted hydrogen produces a *white* precipitate, but does not act at all unless the solution is neutral.

Crystals for which sulphate of zinc may be mistaken.—*Sulphate of magnesia and oxalic acid.* They are scarcely to be distinguished from the first by the mere appearance; but the styptic taste of the zinc, and the peculiar nauseous flavour of the magnesian salt, distinguish them at once. The tests above mentioned are also quite characteristic. The intensely acid character of the oxalic acid readily distinguishes it from the sulphate of zinc, and there are characteristic differences in the appearance of the crystals, not easily described, but readily recognised when the two are placed side by side.

Medicinal properties. — *Tonic*, in small doses; *emetic*, in large ones. *Astringent and stimulant*, when applied externally. Its tonic effects are not distinguished by any peculiarities, except that when first administered it sometimes causes nausea or vomiting. It has a remarkable power in overcoming some spasmodic actions, when associated with a languid state of the system, as is shown by its good effects in chorea. It checks the secretion from mucous surfaces, and causes constipation. When locally applied in the form of solution it acts as an astringent and stimulant; exciting inflammation if applied to the healthy conjunctiva; but, when the vessels are in a relaxed or debilitated state, it causes their contraction, and thereby relieves chronic ophthalmia.

Characteristics as an emetic. — It operates *certainly and quickly*, generally in from five to ten minutes, seldom more than once or twice, causing very little nausea, and scarcely any subsequent depression; it is therefore peculiarly well suited for administration on the accession of fever, in debilitated subjects, in whom the object is to produce a decided impression upon the system without adding to the existing prostration. In an overdose it is not poisonous, and may therefore be given with great advantage in cases of narcotic poisoning, in which sulphate of copper and tartar-emetic are in some respects objectionable.

Uses. — *Chorea.* Pereira speaks very doubtfully of its good effects in this disease; but it proves very useful amongst the outpatients at Guy's Hospital. It must be continued for some time, and the dose gradually increased to gr. xv or ℈j. *Bronchitis, with excessive secretion of mucus*, especially in elderly persons who have taken cold upon an old bronchial cough; the sulphate, combined with myrrh, is then very useful. *Diarrhœa and chronic dysentery*, either taken by the mouth, or administered in an enema. In *gonorrhœa* and *gleet*, as an injection. In *leucorrhœa*, and all the train of nervous symptoms described by Dr. Addison as dependent upon deranged uterine functions, a strong injection of this salt (liquor aluminis comp. p. 388.) produces the most marked benefit. In *chronic ophthalmia* and in the *purulent ophthalmia* of *infants*, it may be used; but the solution in the first case should generally be weaker than in the second. To *old flabby ulcers*, this salt, in solution, is a common astringent application.

Dose and administration. — As an emetic, ℈j to ʒss, or ℈ij; a smaller quantity often fails, though sometimes gr. ij or gr. iij cause nausea. As a tonic and expectorant gr. ij to begin with. It is surprising how the tolerance of this medicine increases with its employment. In chorea the dose may be gradually increased from gr. ij to ℈j, or even more, without causing sickness. As an injection in the cases mentioned, from ʒij to the pint, to ℥ss or an ounce, may be used, according to circumstances; generally, about ʒij to the pint. As a collyrium, gr. ij to gr. viii to the ounce, for adults; or, in the case of infants, gr. x in the first instance, gradually diminishing the strength as the disease subsides. For internal administration the form of pill is the best; it may be combined with extract of gentian. As an emetic, it should be given in solution.

CALAMINA PRÆPARATA, *L. E.*

PREPARED CALAMINE.

Synonyme. Lapis Calaminaris præparatus.

Native carbonate of zinc, burnt, rubbed to a very fine powder, and levigated.

Characters and tests.—It is almost entirely dissolved by dilute sulphuric acid, emitting no bubbles of carbonic acid, or very few: this solution, on the addition of ammonia or potash, throws down what is redissolved on the addition of either in excess.

Remarks.—Dr. Brett has examined several samples of what is sold as prepared calamine, and he finds that they contain, on an average, 83 per cent. of sulphate of barytes, some sesquioxide of iron, carbonate of lime, a very small quantity of sulphuret of lead (?), and scarcely a trace of zinc. No bad effects have, however, been observed to follow from this unsuspected employment of a salt of barytes. The sulphate is insoluble, and as this preparation is only used as an absorbent application externally, it is not probable that the mistake will be of any consequence. Of course, with such a compound, the London tests would entirely fail.

Description, uses, &c.—Calomel is a heavy reddish powder, which is only used externally, as an absorbent. It may be dusted upon the folds in the skin of infants to prevent excoriation, and it has an advantage over flour, which is sometimes used, in not becoming offensive when moistened and heated by the child's secretions. It is often dusted upon large suppurating surfaces to absorb the pus and cause contraction in the granulations, and may be applied in the same way to chapped nipples.

Officinal preparation.—Ceratum Calaminæ.

ZINCI VALERIANAS, *D.*

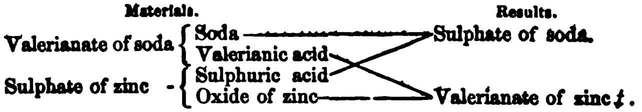
VALERIANATE OF ZINC.

Take of Valerianate of soda, two ounces and a half.
Sulphate of zinc, two ounces and seven drachms.
Distilled water, one quart.

Dissolve the valerianate of soda in half, and the sulphate of zinc in the remainder of the water, and having raised both solutions to 200°, mix them, and skim off the crystals which are produced.

Let the solution be now evaporated at a temperature not exceeding 200°, until it is reduced to the bulk of four ounces, removing, as before, the crystals from the surface, in proportion as they form, and placing them with those already obtained. The salt thus procured is to be steeped for an hour in as much cold distilled water as is just sufficient to cover it, and then transferred to a paper filter, on which it is to be first drained, and then dried at a heat not exceeding 100°.

Process. — This is an instance of double decomposition, in which the valerianic acid leaves the soda and combines with the oxide of zinc to form valerianate of zinc, which, being but slightly soluble, separates as crystals, whilst the sulphuric acid leaves the oxide of zinc and combines with the soda, forming sulphate of soda, which is removed by filtration.



Characters. — Valerianate of zinc is in the form of minute white crystals, so small as scarcely to be recognised as crystals when dried. It is very slightly soluble in cold water, but is soluble in hot water. At 212° it appears to be decomposed, the water assuming an opaque milky character and an oily-looking deposit lining the interior of the tube in which it is boiled, a strong odour of valerianic acid being evolved at the same time. The valerianate of zinc has a strong but not overpowering odour of valerian, which remains for several hours in the room in which it has been experimented upon, or even simply exposed to the air.

Adulterations. — Valerianate of zinc is liable to be adulterated with other salts of zinc, flavoured with oil of valerian; it ought not to have too powerful an odour of valerian, and, when put into cold water, no film of oil ought to be apparent upon the surface of the water. Conclusive and easily applied tests for its purity are, as yet, a desideratum.

Medicinal properties and uses. — *Tonic* and *antispasmodic.* It is used chiefly in *hysteria*, *chorea*, and *epilepsy*, being the diseases in which zinc and valerian have long been used separately; but the confidence of the profession in this and the other valerianates having been, perhaps, unduly taxed at first, has declined rather than increased, and they are less frequently used at present than on their first introduction. It has been used successfully in some cases of tic douloureux which have resisted other treatment. The dose was gr. ¼ every four hours.

Dose.— Gr. j to gr. iij, in the form of pill.

MISTURÆ.

MIXTURES.

MISTURA ACACIÆ, *L. D. E.*

ACACIA MIXTURE.

Synonyms. Mucilago Acaciæ, *D.* Mucilago, *E.* Mucilago Arabici Gummi, *D.*

Take of Acacia, powdered, ten ounces (℥iv, *D.*).
Boiling distilled water, a pint (f℥vi, *D.*).

Rub the acacia with the water, gradually poured in, until it is dissolved. Dissolve the gum in the water with occasional stirring, then strain through flannel.

E. Mistura Acaciæ.—Take of mucilage, f℥iij; Sweet almonds, ʒx; Pure sugar, ʒv; Water, Oij. Steep the almonds in hot water and peel them; beat them to a smooth pulp in an earthenware or marble mortar, first with the sugar, and then with the mucilage; add the water gradually, stirring constantly; then strain through linen or calico.

E. Mucilago (Mucilage).—This corresponds closely with the mist. acaciæ of the Ph. L., the mistura acaciæ of the Ph. Ed. being very different from it.

Take of gum Arabic, ℥ix; Cold water, Oj. Mix them, allow the gum to dissolve without applying heat, but with occasional stirring; then strain through linen or calico.

ACACIA (Various species). Polygamia Monœcia; Leguminosæ.

Description and varieties.—Acacia, or gum arabic, is obtained by spontaneous exudation from the trunk and branches of the acacias; sometimes incisions are made to procure a larger quantity. It seems to be a product of disease, for the largest amount is obtained from sickly trees, and in the hottest seasons. The gum from the same tree is very variable in colour and appearance. There are two principal varieties:—

Turkey or *Arabic.* Almost colourless, in regular tears, having a glassy fracture; brittle, and entirely soluble in hot or cold water, but insoluble in alcohol or ether.

Senegal. In larger masses; more irregular; and frequently containing air in the interior; often mixed with sticks and impurities; colour sometimes deep red; not so easily pulverised, and having a conchoidal fracture.

Adulterations.—Flour is sometimes mixed with powdered gum, and the different sorts are often mixed together.

Characters.—White or yellowish; semi-transparent, or cracked and opaque; brittle; it is soluble in water.

Medicinal properties.—*Demulcent.*

Uses.—As a demulcent mixture in *coughs*, *diarrhœa*, or *gonorrhœa*. It is often employed to suspend substances in water which do not readily combine with that liquid, as copaiba, oils, or resins.

Composition.—*Arabin*, which is soluble in hot or cold water, and when dissolved soon becomes sour; and *malate of lime*.

Incompatibles.—*Spirit of wine* or *tinctures*, and *ether;* all of which precipitate gum from strong solutions; but in the proportions likely to be prescribed in a cough mixture, it may be given along with paragorie or laudanum. *Acetate of lead*, which might perhaps be joined with it in an injection under the notion of obtaining its demulcent properties, precipitates it so much as to be quite incompatible.

Dose.—Ad libitum.

MISTURA AMMONIACI, *L. D.*

AMMONIACUM MIXTURE.

Synonyme. Lac Ammoniaci.

Take of Ammoniacum (prepared), five drachms.
Distilled water, a pint.

Rub the ammoniacum with the water, gradually poured in, until they are perfectly mixed.

Remarks upon the mixture.—It is the usual form for the administration of this drug, and it may be combined with ipecacuanha or squill. The acetate of squill should be avoided, as it slightly curdles the mixture.

Dose.—In pills, from gr. x to ʒss; of the mixture, from f℥ss to f℥j.

DOREMA AMMONIACUM (Pentandria Digynia; Umbelliferæ).

Description.—Ammoniacum is one of the class called *gum-resins*. It is not obtained by means of incisions or spontaneous exudation; but when the plant which yields it has attained perfection it is pierced by innumerable beetles, and from the wounds thus made the juice exudes, which, when dried by the sun, constitutes ammoniacum. It occurs in *tears*, as it exudes from a single wound; or in *masses*, resulting from the union of many tears. Its colour, externally, is a brownish-yellow; and internally, its fracture is a dead-white colour, like that of opaque arsenious acid, with a smooth surface. In its interior are frequently found the seeds (fruit) of the plant, round which the juice has concreted. The masses, when examined, are found to consist of agglutinated tears. It is sometimes soft, dark, and impure. It has little or no smell at common temperatures, but, when heated, it has a faint, peculiar, unpleasant odour.

Characters.—It is either in lumps, or has a kind of granular appearance: what is in lumps requires purification.

Substances for which ammoniacum may be mistaken. — The *tears*, for *olibanum* or for *amber*; the *masses*, for *galbanum*. It is distinguished by its smooth, brownish-yellow exterior, and by its smooth, dead-white appearance internally, when broken.

Medicinal properties. — Very slightly *antispasmodic*, and never used for this property. It is a *stimulant expectorant*, promoting the expulsion of mucus in chronic bronchitis. Applied to the skin it causes irritation, and at length a papular eruption.

Uses. — Ammoniacum is frequently employed in the *chronic bronchitis* of elderly persons, and in chronic coughs with copious expectoration; but it should not be used where irritation or inflammation of the mucous membrane exists. Externally, it is applied in the form of a plaster for the removal of glandular enlargements, or of chronic enlargements of the joints.

Composition. — *Resin*, *gum*, and a small quantity of *volatile oil.* Proof spirit is its proper solvent, as rectified spirit does not dissolve the gum, and water alone does not dissolve the resin. When triturated with water, or, better still, with the yolk of an egg, it forms a milky emulsion.

Dose. — Gr. x to ʒss, in the form of pills.

SAGAPENUM.

Description. — The plant yielding sagapenum is unknown, but it is supposed to be umbelliferous, and a species of ferula. Sagapenum seldom occurs in separate tears, but is generally in dark, mottled masses, formed by their union. It closely resembles galbanum in appearance and properties, but may be distinguished by its odour, which is much more powerful, and resembles that of weak assafœtida.

Composition. — *Volatile oil; gum-resin.*

Properties and uses, correspond with those of the gum-resins generally, being *stimulant* and *antispasmodic.* It is more feeble than assafœtida, which it most nearly resembles. It is seldom employed alone; but the compound pill is useful in constipation induced by sedentary habits, being a warm and stimulating laxative.

Dose. — Gr. v to ℈j.

MISTURA AMYGDALÆ, *L. D. E.*

ALMOND MIXTURE.

Synonyma. Mistura Amygdalarum, *E.* Lac Amygdalæ.

Take of Confection of almond, two ounces and a half.
Distilled water, a pint.

Add the water to the confection, gradually, while rubbing them, until they are mixed; afterwards strain through linen.

D. Sweet almonds, ʒv; White sugar, ʒij; Gum Arabic in powder, ʒj; Distilled water, f℥viii. Steep the almonds in hot water for five minutes, and having removed their external coat, beat them with the sugar and gum in a mortar into a coarse powder; add the water gradually, and triturate so as to form a uniform mixture; finally, strain through muslin.

E. Conserve of almonds, ℥ij; Water, Oij: or, Sweet almonds, ʒx; Sugar, ʒv; Mucilage, f℥ss; Water, Oij. Proceed as above, in the Ph. Dub.

Medicinal uses. — This mixture is generally employed as a vehicle for other remedies, as salines, sudorifics, alkaline carbonates, or hydrocyanic acid, in the affections for which they are respectively prescribed. It is sometimes employed alone as a demulcent in troublesome coughs, or in affections of the urino-genital organs.

Incompatibles. — Acids, spirit of wine, and tinctures, render this preparation turbid, and should not be exhibited with it.

Dose.—f℥j to f℥ij, or *ad libitum.*

MISTURA ALTHÆÆ, *E.*

Take of Althæa root, dried, four ounces.
Raisins, freed from the seeds, two ounces.
Boiling water, five pints.

Boil down to three pints, and strain through linen or calico, and when the sediment has subsided, pour off the clear liquor for use.

Medicinal properties and uses. — *Demulcent,* in *catarrhs.*

Dose.—Ad libitum.

MISTURÆ CAMPHORÆ, *L. D. E.*

CAMPHOR MIXTURE.

Synonyme. Camphor Julep.

Take of Camphor, half a drachm.
Rectified spirit, ten minims.
Distilled water, a pint.

First rub the camphor with the spirit, and then with the water, gradually poured in, and strain through linen.

D. Tincture of camphor, f℥j; Water, Oiij. Shake them together, and, after the mixture has stood 24 hours, filter through paper.

E. Camphor, ℈j; Sweet almonds, Sugar, of each, ℥ss; Water, Oj. Steep the almonds in hot water and peel them; rub the camphor and sugar well together in a mortar; add the almonds; beat the whole into a smooth pulp; add the water gradually, with constant stirring, and then strain.

Remarks. — Water dissolves very little camphor, each ounce of the mixture containing about a grain; this small quantity, however, often produces a beneficial effect. It is useful when combined with small doses of sesquicarbonate of ammonia in the debility which remains after an attack of influenza, proving more efficacious than the ammonia by itself, perhaps from allaying some of the morbid irritability which is then present. It is generally considered slightly stimulant, and is principally used as a vehicle for other remedies. It is a valuable ingredient in evaporating lotions.

Dose. — f℥ss to f℥ij, three or four times daily.

MISTURA CAMPHORÆ CUM MAGNESIA, *E.*

Take of Camphor, ten grains.
Carbonate of magnesia, fifteen grains.
Water, six fluid ounces.

Triturate the camphor and carbonate of magnesia together, adding the water gradually.

Remarks. — The magnesia causes the camphor to be rather more easily suspended in the water, and its presence makes the mixture slightly alkaline. It may be prescribed in any case in which the two remedies are likely to be useful.

Dose. — f℥ss to f℥j.

MISTURA CREASOTI, *E.*

CREASOTE MIXTURE.

Take of Creasote and acetic acid, of each, sixteen minims.
Compound spirit of juniper, and syrup, of each, one fluid ounce.
Water, fourteen fluid ounces.

Mix the creasote with the acid, then gradually add the water, and, lastly, the syrup and spirit.

Remarks. — The acetic acid aids the solution of the creasote, which may also be combined with water by trituration with mucilage without the acid. This mixture is a convenient form for its administration.

Dose. — The dose of creasote is from ♏j to ♏ij; of the mixture, therefore, f℥j to f℥ij, as each f℥j contains ♏j.

MISTURA CRETÆ, *L. D. E.*

CHALK MIXTURE.

Synonyme. Mistura Cretacea.

Take of Prepared chalk, half an ounce.
Sugar, three drachms.
Acacia mixture, a fluid ounce and a half.
Cinnamon water, eighteen fluid ounces.
Mix.

D. Chalk, ʒij; Simple syrup, Acacia mixture, aa f℥ss; Cinnamon water, f℥vii.

E. Chalk, ʒx; Sugar, ʒv; Mucilage, f℥iij; Spirit of cinnamon, f℥ij; Water, Oij.

Medicinal properties.—This is a valuable *antacid*, and is much used in *diarrhœa*, especially that which occurs during the fruit season. It is generally combined with astringents, as the tinct. kino or catechu. It is often injudiciously employed in very large quantities by pregnant women, to relieve the heartburn which is so troublesome during pregnancy; the condition of the digestive organs, which gives rise to this affection, is much better treated by small doses of the mineral acids in some bitter infusion. The former treatment merely palliates a symptom; the latter removes the cause of the disease by restoring the digestive organs to a healthy state, and imparting tone to the system generally.

Dose.—f℥ss to f℥jss, every three or four hours.

MISTURA FERRI AROMATICA, *D.*

AROMATIC STEEL MIXTURE.

Take of Peruvian bark (crown or pale), in powder, one ounce.
Calumba root, in coarse powder, three drachms.
Cloves, bruised, two drachms.
Iron filings, separated by a magnet, half an ounce.

Digest for three days, with occasional agitation, in a covered vessel, with as much peppermint water as will give twelve ounces of a filtered product, and then add, of
Compound tincture of cardamoms, three fluid ounces.
Tincture of orange peel, three drachms.

This mixture should be kept in a well-stopped bottle.

Remarks.—This is a good aromatic tonic for such cases as are mentioned in the next article.

Dose.—f℥ss to ℥jss, three or four times a day.

MISTURA FERRI COMPOSITA, *L. D. E.*

COMPOUND IRON MIXTURE.

Synonyme. Steel Mixture. Griffith's Mixture.

Take of Myrrh, powdered, two drachms.
Carbonate of potash, a drachm.
Rose water, eighteen fluid ounces (f℥xvi, *D.*).
Sulphate of iron, powdered, two scruples and a half (ʒj, *D.*).
Spirit of nutmeg, a fluid ounce (f℥ij, *D.*).
Sugar, two drachms.

Rub together the myrrh with the spirit and the carbonate, and to these, while rubbing, add first the rose water with the sugar, then the sulphate; put the mixture immediately into a glass vessel, and stop it.

Process.—In this preparation double decomposition takes place, precisely as when sulphate of iron is decomposed in preparing the ferri sesquioxydum; except that, carbonate of potash being used in this case, sulphate of potash is formed, instead of sulphate of soda, as in that preparation.

Composition.—This preparation contains protocarbonate of iron in a state of suspension; and iron in this form is more active than when it has become sesquioxide, being then almost insoluble. This mixture has at first a greenish colour, but the protocarbonate of iron, to which it is owing, very readily absorbs oxygen from the air and becomes reddish-yellow sesquioxide.

Mist. ferri co. should not be made long before it is wanted for use; for not only is its efficacy diminished by keeping, but, from the different appearance it presents when recently prepared, to that which it exhibits when long kept, the patient would naturally suppose that some mistake had occurred in dispensing it. The mixture ought to be kept in a very carefully stopped bottle, in order, as far as possible, to exclude the air. The carbonate of potash is in considerable excess, and helps to dissolve the myrrh, by which means the carbonate of iron is better suspended, in the saponaceous compound thus formed.

In preparing this mixture, fine myrrh should be powdered at the time, instead of applying what has been powdered on the large scale by the drug grinders. By this means a much more elegant and perfect mixture is obtained.

Medicinal properties and uses.—This is a very valuable form for the administration of iron, and is constantly used in *chlorosis* and *amenorrhœa*, dependent upon general debility; in which there is a bloodless countenance, indicating deficiency of the red particles of the blood, which derives its colour from the iron contained in them. It is sometimes employed with benefit, when combined with hydrocyanic acid, in *phthysis*, where there is more exhaustion than fever; but as it is liable to increase the vascular excitement, its effects should be carefully watched: this combination produces a bluish coloured mixture, with the formation of varying compounds of iron and cyanogen; but the chemical change is not to be considered an objection to its use, if the combination is found to be beneficial. The mist. ferri co. should be avoided where there is irritation or inflammation of the mucous membrane of the alimentary canal.

Incompatibles.—Acids, and bitter infusions containing tannin.

Dose.—f℥ss to f℥jss, three or four times daily.

MISTURA GENTIANÆ COMPOSITA, *L.*

COMPOUND MIXTURE OF GENTIAN.

Take of Compound infusion of gentian, twelve fluid ounces.
Compound infusion of senna, six fluid ounces.
Compound tincture of cardamoms, two fluid ounces.

Mix.

Medicinal uses.—Usefully employed in dyspeptic affections accompanied with constipation.

Dose.—f℥j to f℥ij.

MISTURA GUAIACI, *L. E.*

GUAIACUM MIXTURE.

Take of Guaiacum (resin), powdered, three drachms.
Sugar, half an ounce.
Powdered acacia, two drachms.
Cinnamon water, a pint.

Rub the sugar with the guaiacum and acacia, and to these, while rubbing, add gradually the cinnamon water.

GUAIACUM, GUAIACUM OFFICINALE (Decandria Monogynia; Zygophyllaceæ).

Description and varieties.—Guaiacum is a resin obtained from the wood of the Guaiacum officinale, or lignum vitæ. It is sometimes found in large masses in the interior of the trees, from which it is obtained by simply splitting the wood; at other times a hole is bored longitudinally in the centre of a log, and the end which has not been pierced being put into a fire, the heat causes the resin to melt and flow along the hole into a vessel placed to receive it; sometimes the wood is cut into chips, and boiled in water, when the resin rises to the surface, and is removed; it also exudes spontaneously from the tree, at all seasons of the year.

Guaiacum resin is semitransparent when freshly broken, and has a green tint, by which it is distinguished from every other substance in the Materia Medica. It is often opaque, being covered by a thin layer of the powdered resin, which may be seen to have, also, a green colour, though not so bright as that of the freshly broken resin.

Medicinal properties.—Guaiacum is an *acrid stimulant*, causing heat and dryness of the mouth, with increase of the secretions from the skin and kidneys. If the surface of the body is kept warm, it acts as a powerful *sudorific*, and also often produces copious diarrhœa. It excites the action of the exhalants more than that of the heart or large vessels.* It acts as an *alterative* without any peculiar perceptible effects, but has been known to cause salivation when long continued. It sometimes produces a cutaneous eruption like measles, and is rather liable to disorder the stomach.

Uses.—It has been highly extolled in *syphilis*, but is now found to be useful only as a sudorific alterative in *secondary* disease, after a course of mercury, or to relieve *venereal rheumatism* and *nocturnal pains*. In the *rheumatism*, both acute and chronic, of debilitated patients, it is often useful, and is an ingredient in the celebrated "Old Pensioner." In *chronic atonic gout* it has been employed, but it is *inadmissible* in an *acute* case. In *chronic skin diseases*, especially if there is a scrofulous taint, it is often useful. In *acute cynanche tonsillaris*, even when suppuration appears almost inevitable, the best effects are produced by repeated doses of gr. x to ℈j of the powder; or of f℥ss of the tincture.† Dr. Cameron confirms the statement that scruple doses twice a day act "almost like a charm in quinsy."

Composition.—Guaiacum consists chiefly of a peculiar *resin* (guaiacic acid) *without* any *gum;* hence the acacia is necessary for its suspension in water.

Characters and tests.—*Ed.* Fresh fracture red, slowly passing to green; the tincture slowly strikes a lively blue colour on the inner surface of a thin paring of a raw potato.

The resin is also characterised by striking a blue colour when triturated with gluten, as in flour. It does not cause any colour with starch, and the colour with gluten is not always produced instantly.

Nitrous acid changes the colour of the resin to blue, and spirit of nitric ether to brown. Guaiacum is not soluble in oil of turpentine, which may be used as a test of the presence of common resin. If the suspected sample is partially dissolved by oil of turpentine, it may be considered as an adulterated one.

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* Cullen.

† Bell, Med. Gaz. vol. xxvii. p. 202.; Carson, Med. Gaz. vol. xxix. p. 310., and others.

Dose.—Of the powdered guaiacum, from gr. x to ʒss; of the mixture, f℥ss to ℥jss, with warm drinks.

MISTURA HORDEI, *E.*

BARLEY WATER.

This is identical with Decoctum Hordei co., which see.

MISTURA SCAMMONII, *E.*

SCAMMONY MIXTURE.

Take of Resin of scammony, seven grains.
Best skimmed milk, three fluid ounces.

Triturate the resin with a little of the milk, and gradually with the rest of it, till a uniform emulsion is formed.

Remarks.—This forms a tasteless mixture, and is a convenient mode of administering scammony.

Dose.—The whole of it, or twice as much, if necessary.

MISTURA SPIRITUS VINI GALLICI, *L.*

MIXTURE OF SPIRIT OF FRENCH WINE.

Synonyme. Brandy and Water. Egg Flip.

Take of Spirit of French wine (brandy),
Cinnamon water, each, four fluid ounces.
The yolks of two eggs.
Sugar, half an ounce.
Oil of cinnamon, two minims.
Mix.

Medicinal uses.—This is an agreeable and excellent stimulant and restorative. It is designed to be used in the last stage of low fever, or in extreme exhaustion.

Dose.—f℥ss to f℥ij, to be repeated according to the urgency of the case.

MUCILAGES, *D.E.*

MUCILAGO ACACIÆ, *D.*; MUCILAGO, *E.*

Synonyme. Mucilage. Acacia Mucilage. Acacia Mixture, *L.*

D. Take of Gum arabic, ℥iv; Water, f℥vj.
E. Gum arabic, ℥ix; Water (cold), Oj.

Dissolve the gum with occasional stirring (without heat, *E.*), and strain.

Properties.—Demulcent. See Mistura Acaciæ.

MUCILAGO AMYLI, *D.E.*

STARCH MUCILAGE.

Take of Starch, half an ounce.
Water, half a pint (*D.*), a pint (*E.*).

Triturate the starch with the water, gradually added; then boil for a few minutes.

Properties and uses.—Demulcent. See Decoct. Amyli.

MUCILAGO HORDEI, *D.*

BARLEY MUCILAGE.

Synonyme. Barley Water.

Take of Ground pearl barley, half an ounce.
Water, sixteen fluid ounces.

Triturate the barley with the water, gradually added; then boil for a few minutes.

Properties and uses.—Demulcent. See Decoct. Hordei.

MUCILAGO TRAGACANTHÆ, *E.*

TRAGACANTH MUCILAGE.

Take of Tragacanth, two drachms.
Boiling water, nine fluid ounces.

Macerate for twenty-four hours, then triturate to dissolve the gum, and express through linen or calico.

Remarks upon the mixture.—When tragacanth is macerated in hot water, it does not dissolve like acacia, but it swells up, and by trituration is diffused uniformly through the fluid, forming a thick mucilage. If the compound powder of tragacanth of the Ph. L. is used, which contains acacia, starch, and sugar, the long maceration ordered above is unnecessary.

Properties and uses.—Demulcent. It is chiefly used in the early acute stage of *gonorrhœa*.

Dose.—Ad libitum.

OLEA DESTILLATA.

DISTILLED OILS.

Remarks.—DISTILLED, or, as they are frequently called, volatile, essential, or ethereal oils are obtained by distillation from vegetable and other substances, and generally resemble in flavour and odour the source from which they are derived. They are all compounds of carbon and hydrogen, and some contain oxygen, in addition, as an essential ingredient, whilst others only absorb a portion as they become old. With few exceptions they are lighter than water, and fluid at ordinary temperatures, though some become solid in winter. They are all readily soluble in spirit, and most of them in ether, and also, to a very slight extent, in water; sufficient, however, is dissolved to impart their flavour and odour, especially if the recent vegetables are distilled with it. They are also miscible with fixed oils, with which they are often adulterated. The fraud may be detected by placing the suspected oil on white paper and holding it before the fire: if pure, it leaves the paper clean; but if any fixed oil is present, it produces a greasy stain, which is not removed by continuing the heat. If spirit of wine is mixed with the oil, a milky fluid is produced when it is dropped into water, instead of merely a transparent film of oil being formed on the surface. Adulteration, by the addition of a cheaper volatile oil, cannot be detected with certainty.

The *amount* of adulteration with spirit of wine may be detected as follows:—Take a test tube and half fill it with the suspected oil; then add a *small* quantity of dry chloride of calcium, lightly close the tube with a cork, and heat it to the boiling point for three or four minutes; if much spirit is present, the whole of the chloride will be dissolved, and will form a heavy fluid layer beneath the oil; if but little spirit has been present, the pieces of chloride will coalesce more or less perfectly; the quantity of the chloride must be increased until some remains undissolved; the proportion of spirit may be ascertained pretty accurately by comparing the quantity of oil after the boiling, when the tube has cooled, with that present before the operation was commenced.* For this to be a fair test, an equal quantity of unsuspected oil should be boiled the same length of time in a similar test tube, and the sample tested should be compared with this.

E. Flowers, leaves, and fruit generally yield the finest oils, and in greatest quantity, when they are used fresh. Many, however, answer equally well if they have been preserved by beating them into a pulp with about twice their weight of muriate of soda, and keeping the mixture in well-closed vessels.

In the following table the volatile oils are arranged alphabetically, and are very slightly noticed, as they are not of sufficient importance to deserve separate consideration. The most important are described more fully at the end of the table.

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* Borsarelli, Chemist, vol. i. p. 253.

Name.	Composition.	Properties and Characteristics.	Dose.	Obtained from
Ol. Anethi, *E.* Oil of Dill.	- -	Carminative - -	♏ij to ♏v	The fruit (seeds).
Ol. Anisi, *L. D. E.* Oil of Aniseed.	$C^{20}H^{12}O^{2}$	Agreeable carminative. Becomes solid at 50° F.	♏ij to ♏v	„
Ol. Anthemidis, *L. D. E.* Oil of Chamomile.	$C^{10}H^{8}O^{2}+C^{20}H^{16}$	Antispasmodic. Checks the griping of purgatives.	♏ij to ♏v	The flowers.
Ol. Aurantii, (not officinal). Oil of Neroli.	- -	Fragant odour.	- -	„
Ol. Bergamii, (not officinal). Oil of Bergamot.	$C^{10}H^{8}$ -	Used only as a scent -	- -	The rind of the fruit.
Ol. Cajuputi, *L. E.* Oil of Cajuput.	$C^{10}H^{9}O=C^{10}H^{8}HO$	Diffusible stimulant; antispasmodic; diaphoretic.	♏ij to ♏vi	The leaves (by fermentation).
Ol. Carui, *L. D. E.* Oil of Caraway.	- -	Agreeable carminative	♏ij to ♏vi	The fruit (seeds).
Ol. Cassiæ, *E.* Oil of Cassia.	- -	Stim.; aromatic -	♏j to ♏iij	The bark.
Ol. Caryophylli, *L. D. E.* Oil of Cloves.	- -	Stim. Checks griping from purgatives. Dropped into carious teeth.	♏j to ♏v	The buds.
Ol. Cinnamomi, *L. D.* Oil of Cinnamon.	$C^{20}H^{11}O^{2}$	Stimulant and aromatic	♏j to ♏iij	The bark.
Ol. Copaibæ, *E.* Oil of Copaiba.	$C^{10}H^{8}$ -	Checks mucous secretions.	♏xx to fʒj	The balsam.
Ol. Cubebæ, *L. D. E.* Oil of Cubebs.	$C^{15}H^{12}$ -	Acrid stim. Checks mucous secretions.	♏x to fʒj	The fruit.
Ol. Fœniculi, *L. D.* Oil of Fennel.	- -	Carminative - -	♏j to ♏v	„
Ol. Juniperi, *L. D. E.* Oil of Juniper.	$C^{10}H^{8}$ or $C^{20}H^{16}$	Diuretic - -	♏ij to ♏vi	„
Ol. Lavandulæ, *L.* Oil of Lavender.	$C^{15}H^{14}O^{2}$	Stimulant; agreeable flavour. Seldom used internally.	♏ij to ♏vi	The flowers.
Ol. Limonum, *L.* Oil of Lemons.	$C^{10}H^{8}$ or $C^{5}H^{4}$	Agreeable flavour and odour.	♏ij or ♏iij	The rind of the fruit.
Ol. Menthæ Piperitæ, *L.* Oil of Peppermint.	$C^{20}H^{20}O^{2}$	Antispasmodic. Corrects griping purgatives.	♏ij to ♏v	The entire herb.
Ol. Menthæ Pulegii, *L.* Oil of Pennyroyal.	$C^{10}H^{8}$ -	Similar. Emmenagogue ?	♏ij to ♏v	„
Ol. Menthæ Viridis, *L.* Oil of Spearmint.	$C^{35}H^{28}O$	Similar. Not so powerful or agreeable as the last.	♏ij to ♏v	„
Ol. Myristicæ, *D.* Oil of Nutmeg.	- -	Stimulant; aromatic. Seldom used internally.	♏j to ♏iv	The fruit.
Ol. Origani, *E.* Oil of Marjoram.	$C^{50}H^{40}O$	Acrid stimulant. Not used internally. Is put into carious teeth.	- -	The entire herb.
Ol. Pimentæ, *L. D. E.* Oil of Pimenta.	- -	Corrects griping purgatives. Carminative.	♏ij to ♏vi	The fruit.
Ol. Rosmarini, *L.* Oil of Rosemary.	$C^{45}H^{38}O^{2}$	Stimulant. Only used externally.	- -	The tops.
Ol. Rutæ, *L. E.* Oil of Rue.	$C^{20}H^{20}O^{2}$	Antispasmodic; emmenagogue.	♏iij to ♏v	The flowers.
Ol. Sabinæ. Oil of Savine.	$C^{20}H^{16}$ -	Emmenagogue. Poisonous in an over dose.	♏ij to ♏vi	The tops.
Ol. Sassafras, *E.* Oil of Sassafras.	$C^{10}H$[illegible]O^{2}	Stimulant and diaphoretic.	♏ij to ♏x	The bruised root.
Ol. Terebinthinæ. Oil of Turpentine.	$C^{20}H^{16}$ -	See description at length.	- -	Turpentine.

In the foregoing table it will be seen that many of the essential oils agree in composition, and consist of $C^{10}H^{8}$, whilst others consist of $C^{20}H^{16}$; and oil of cubebs consists of $C^{15}H^{12}$. These are all multiples of $C^{5}H^{4}$, which is considered to be a sort of type of the whole, although none of them possess precisely that constitution. Some of these oils are capable of forming solid compounds with chlorine or other agents, and it is assumed that one atom of the oil enters into this compound, from which we may calculate its equivalent. Some years since the oil of turpentine was said to consist of $C^{10}H^{8}$, like some of the other oils; but it is now generally stated to be $C^{20}H^{16}$, because this equivalent of the oil combines with hydrochloric acid, and forms a solid body resembling camphor.

OLEUM ANISI.

OIL OF ANISE.

Remarks.—This has a more agreeable flavour than many of the volatile oils. In winter it is usually solid in this country, as it contains a large proportion of *stearoptene*, the solid principle of volatile oils, compared with the *eleoptene*, the fluid principle. It congeals at 50° F., and does not again liquefy under 62° F.

It is principally used in this country as a carminative, to relieve the flatulent colic of children. It forms an agreeable addition to magnesia mixtures for infants. In Ireland and on the Continent it is employed to flavour liqueurs.

Dose.—♏j to ♏v, diffused through water by means of sugar; or added to other medicines.

OLEUM ANTHEMIDIS.

OIL OF CHAMOMILE.

Description.—Yellow; strong odour; pungent, nauseous taste.

Properties.—*Stimulant; antispasmodic.* Checks the griping of purgatives, and is hence frequently combined with cathartics in pills.

Dose.—♏j to ♏v.

OLEUM CADINUM. (Not Off.)

JUNIPER TAR. HUILE DE CADE, FR.

This is a tarry-looking substance, which is obtained by the destructive distillation of the *Juniperus oxycedrus*. It is well known in France, but is little used in this country. Its employment is confined to diseases of the skin, and it has lately been brought under notice in England as a remedy for obstinate eczema. It is used in the form of ointment made by mixing about equal parts of the oil and lard, and stiffening it by about a fourth part of suet.

OLEUM CAJUPUTI, *L.D.E.*

OIL OF CAJUPUT.

MELALEUCA MINOR (Polyadelphia Icosandria; Myrtaceæ).

Preparation. — The dry leaves of the plant are put into a dry bag, in which, however, they soon begin to ferment, and become moist; they are then soaked in water for a day, and the oil is afterwards distilled by a slow fire. The quantity yielded is very small.

Description. — Cajuput oil is lighter than water; has a pale green colour, which has been supposed (though erroneously, *Brande*) to be owing to copper; a remarkably powerful odour, resembling a mixture of camphor, rosemary, and cardamoms; and a flavour like that of camphor, succeeded by coolness. It is entirely soluble in spirit, and slightly so in water; it is perfectly volatilised by a moderate heat.

Composition. — $C^{10}H^{9}O$, or $C^{10}H^{8}+HO$.

Adulterations. — It is generally pure; but during the prevalence of cholera, in 1831, it was adulterated with oil of rosemary, distilled from camphor and cardamoms.

Medicinal properties. — Powerful *diffusible stimulant; antispasmodic; diaphoretic.* It is more powerful than the volatile oils distilled from the labiate and umbelliferous plants, such as the mints, and anise, &c. It more nearly resembles valerian in its properties, but does not affect the head or mental faculties.

Uses. — *Flatulent colic; nervous hysterical flatulence* or *spasmodic pains; low fever; cholera.* It acquired a high, but undeserved, reputation in the treatment of this last disease. It is sometimes dropped into a *carious tooth*, and is mixed with olive oil and used as a liniment in *chronic rheumatism.*

Dose. — ♏ij to ♏vi, on a lump of sugar, forming an "oleo-saccharum."

OLEUM CHENOPODII OR SANTONICÆ. (Ph. U. States.)

OIL OF CHENOPODIUM, OR OIL OF WORMSEED.

This oil is obtained by distillation from the *Chenopodium anthelminticum*, and is peculiar to the United States. It has a light-yellow colour when recently distilled, but becomes darker, and even brown by keeping.

Medicinal properties. — *Anthelmintic* in cases either of lumbrici or tape worms. It is reported to be highly efficacious.

Characteristics as an anthelmintic. — Smallness of the dose; may be taken on sugar; not very disagreeable flavour.

Dose. — Generally from four to eight drops for a child, on sugar or milk, repeated night and morning for three or four days (U. S. Dispens.). For adults the dose may be ʒss or more. It should be followed by a purgative.

OLEUM COPAIBÆ, E.

Copaiva Oil.

E. Take of Copaiva, one ounce.
Water, a pint and a half.

Distil, preserving the water; when most of the water has passed over, heat it, return it into the still, and resume the distillation; repeat this process so long as a sensible quantity of oil passes over with the water.

Dose.—♏xv to ♏xxx.

COPAIBA, or COPAIVA, Copaifera Langsdorfii (Decandria Monogynia; Leguminosæ; Mimoseæ).

Description.—Copaiba is obtained from various species of Copaifera, as well as the C. Langsdorfii, named by the London College. Deep incisions are made into the tree, in the wet season or immediately afterwards, from which the resinous juice flows in considerable abundance. Sometimes a single tree will yield twelve pounds in three or four hours. The wounds thus made soon heal, and in one or two years the tree admits of being tapped again.

There are two principal kinds of copaiva, West Indian and Brazilian; the latter being the one chiefly used in England. It is transparent and pale yellow, somewhat thinner than new honey; has a peculiar, not disagreeable odour; and an acrid, aromatic, persistent taste; by long keeping it becomes much thicker, darker, and heavier; it is naturally somewhat lighter than water. West Indian copaiba is thicker, darker coloured, often turbid, with a stronger odour of turpentine, and a more bitter acrid taste.

Chemical properties and adulterations.—Copaiba is not soluble in water, but is soluble in alcohol, ether, and oils. When it is mixed with $\frac{1}{16}$ of its weight of magnesia, it thickens, and in a few hours becomes a uniform solid, which is pretty firm in two or three days. This is a convenient property, as it may thus be administered in the form of pills, which is less disagreeable than the usual one of an emulsion or mixture. A rather larger quantity of the *carbonate* of magnesia is preferred by some to magnesia itself. It is probably never adulterated in this country. If it is pure, and is dried by heat upon a piece of paper, it leaves a dry, translucent spot; which is not the case if oil is present. If shaken with liquor potassæ, it forms a transparent liquid if pure, but not if mixed with oil. If it is dropped upon a hot metallic plate, the odour of turpentine would indicate that substance, if it were present. No fixed oil, except castor oil, would be entirely dissolved by alcohol, which copaiba ought to be.

Composition.—About 30 to 40 per cent. of *volatile oil*, which is composed of $C^{10} H^{8}$; and *resin* or *copaibic* acid.

Medicinal properties.—*Acrid diuretic; stimulant;* and *cathartic.* Its most important property is its influence in checking excessive mucous secretions, especially from the urino-genital mucous membrane; whilst it does this, however, it frequently causes, at the same time, nausea and vomiting, and purging. It is absorbed, and passes off by the urine and breath, communicating a peculiar odour to them; and it also causes heat of the stomach and disagreeable eructations. The late Dr. Sigmond was of opinion that it also caused rheumatic pains in the joints; and states that he has seldom seen a case of so-called gonorrhœal rheumatism, in which this drug had not been given; and he attributes the rheumatism to the medicine and not to the disease*; and in one instance in which very large doses were taken without professional directions, anasarca of the lower limbs ensued (*Braith. Retrosp.* vol. xix. p. 128.). In this opinion he is supported by Dr. Maddox. It is sometimes supposed to cause swelled testicles, but this is very doubtful. It frequently causes eruptions, which resemble the exanthemata, measles, or scarlatina.

Uses.—Copaiba is chiefly used in the treatment of *gonorrhœa*, but it is not nearly so efficacious in that of women, as of men. It has become so identified with this disease as to give rise to objections on the part of patients, if it is advised for any other complaint. It is, however, sometimes usefully employed in *chronic pulmonary catarrh*, in *chronic muco-gastritis*, and *muco-enteritis*, and in *cystirrhœa* and *leucorrhœa*. It is sometimes of great service in an *irritable* and *relaxed condition of the rectum*, accompanied with mucous discharge; and in *hæmorrhoids* consequent upon long continued purging. It is very seldom employed as a purgative; but Mr. Roberts speaks favourably of its effects in *chronic constipation*, when given in repeated doses of ♏viii or ♏x "with compound tincture of lavender."†

Dose and administration.—In gonorrhœa it is very important that a large quantity should be taken in as short a time as possible. At least f℥ss to f℥j should be taken several times daily. There is great difficulty in preventing these large quantities from being rejected by the stomach; and it is said that vomiting is more common if it is taken in the solid form, than if made into emulsion, and combined with some aromatic. It may be advantageously combined with an equal weight of spirit of nitric ether, by shaking them together, or may be swallowed alone, or diffused through water by means of syrup or the yolk of an egg. It is sometimes useful to chew a piece of cinnamon after each dose. It may be given in the form of pills, made with carbonate of magnesia, and covered, whilst soft, with a slip of moistened confectioner's wafer-biscuit paper; in this way it is tasteless, and is less liable to excite nausea than if taken in other ways (*Loxus*). A very fashionable method has lately been to enclose it in capsules of gelatine which are easily made. A wooden or iron rod is made smooth and round at the end, and is dipped into a hot saturated solution of soap in alcohol; when the soap has become solid, the rod is to be dipped into a concentrated solution of gelatine, which may be done two or three times, until the capsule is thick enough: when it is dry, it may be slipped off the end of the rod; it is then to be filled with the copaiba, and a drop or two of the concentrated solution of gelatine placed carefully upon it so as to close the open end of the capsule; this does not sink through the copaiba, but dries upon it and forms a lid which confines it. Sometimes the volatile oil of copaiba is used, and it is preferable, as being equally efficient, the dose smaller, and in being less liable to cause sickness. In all the other diseases in which it is used, the dose should be about ♏v to ♏xv of the copaiba, or half that quantity of the volatile oil.

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* Lancet, 1838-39, vol. ii. p. 337.

† Ibid. 1839-40, vol. i. p. 570.

There are two totally opposite plans for the administration of copaiba in gonorrhœa. In the first, which is generally adopted by British practitioners, the acute stage of the disease is first subdued by general antiphlogistic treatment, and when the discharge is thick, and the scalding diminished, or the disease has assumed more the character of a gleet, the copaiba is given in as large quantities as the stomach will bear, combined with mucilage or yolk of egg, and diffused through some aromatic water. In the other plan, which has not been much adopted in this country, the medicine is given in large quantity from the first, aud depleting measures are or are not taken at the same time, according to circumstances. This plan sometimes produces a speedy cure, but it is not without danger, and sometimes aggravates the symptoms, and produces bloody urine, and other severe consequences.

As a general rule, in all other cases, this drug is decidedly contra-indicated when there is general feverish excitement, or any local inflammation.

OLEUM CUBEBÆ, *L. D. E.*

Oil of Cubebs.

PIPER CUBEBA (Diandria Trigynia; Piperaceæ).

Description.—Cubebs resemble black pepper, except in being lighter coloured, and having a short stalk attached, from which they take the name of piper caudatum, or "tailed" pepper. (See Conf. Piper. Nigri, p. 249.)

Composition.— *Volatile oil,* which constitutes 10 per cent. of the cubebs; *cubebin,* which is crystalline, and said to be identical with piperin; and a *soft resin.* The oil is liable to deposit a crystalline body, if long kept.

Medicinal properties.—*Stimulant; acrid; carminative; diuretic.* Cubebs quicken the pulse, increase the heat of the body, promote the secretion of urine; increase the appetite, and sometimes cause nettlerash; but they are chiefly valued in this country for their property of checking excessive mucous discharges, especially from the urino-genital organs. They may be given at any period of a gonorrhœa, but if taken during the first day or two of the attack, they sometimes aggravate the symptoms. There is no satisfactory evidence of their causing swelled testicle. They are most useful if employed early, and, the later in the disease, the less is their chance of being efficacious; if benefit is not derived in the course of a few days, they seldom do much good if long continued. In 50 cases reported by Mr. Broughton, 10 were cured in from 2 to 7 days; 17 in from 8 to 14 days; 18 in from 15 to 21 days; and 1 at the end of two months: upon 3 of the cases they had no effect.

Uses.—By some eastern nations as a *condiment.* In *gonorrhœa* it is much employed. In *chronic* catarrh of the *bladder.* In *chronic* coryza, when the secretion is thin and copious, very good effects have followed its employment. In *piles* and *leucorrhœa* it has occasionally been useful.

Dose and administration.—Of the *powder.* In gonorrhœa the dose should be large, ʒss to ʒij, three or four times daily; in chronic affections of the bladder, or in the other chronic diseases, the dose is from gr. x to ʒss, thrice daily. The powder very soon spoils, and should be most carefully excluded from the air. Of the *oil;* ♏x, to be increased to ʒj, or as much as the stomach can bear. It may be combined with mucilage or the yolk of eggs, or may be dropped upon sugar; it may be given with liquor potassæ or spiritus etheris nitrici. Christison does not think the oil to be much more powerful than the powder. Of the tincture; fʒss to fʒij, three or four times daily.

Officinal preparations.—Oleum. Tinct.

OLEUM FILICIS MARIS. (Not Off.)

Oil of Male Fern.

This oil is obtained by evaporating an ethereal tincture either of the rhizome or of the buds of the male fern. A pound of the rhizome yields about an ounce and a half of the oil.

Characters of the oil.—This is, properly speaking, an ethereal extract rather than an oil, and consists of volatile oil, fatty matter, and a variety of other ingredients. It has a dark colour and nauseous taste.

Medicinal properties.—*Anthelmintic* in cases of tape worm. The male fern had at one time a very high reputation as a vermifuge, after which it fell into neglect. Its employment has lately been revived, chiefly under the form of the oil; and increasingly numerous reports * bear testimony to its efficiency when given in doses of fʒss to fʒi, and followed by a free dose of castor oil. In many cases the worm was expelled in six or eight hours; the head was not always expelled, but in several instances the patient is reported to have had no further symptoms. The oil has proved efficacious in one or two instances in which kousso had previously been given without success. Pereira has used it, but without success.*

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* Braith. Retrosp. vol. xxiii. p. 141., vol. xxv. p. 140.

Dose, not less than f℥ss, and more frequently f℥j.

NEPHRODIUM (ASPIDIUM) FILIX MAS.

MALE FERN. CRYPTOGAMIA; FILICES.

Description. — Male fern consists of a bundle of matted blackish fibres attached to the rhizome, and forming a dark scaly tuft. After being once seen it is not likely to be mistaken for any other officinal root. The roots may be collected at any time from February to September.

Composition, uses, &c. — Fern root contains a volatile and a fixed oil soluble in ether and alcohol, on which its properties depend, and also several other unimportant ingredients. It is only used as an *anthelmintic* to expel *tape worms*, to which it appears to act as a poison, as they are frequently expelled dead. Two or three drachms of the powdered root are to be taken fasting, and in two hours a jalap cathartic. It sometimes causes vomiting, and is not so certain in its action as oil of turpentine.

Dose. — Of the powdered root (very seldom now used) ℥ij to ℥iij; of the oil ♏xxx, more frequently f℥j; of the tincture, either ethereal or alcoholic, f℥ss to f℥jss, according to age.

FUSEL OIL, *D.*

Synonyme. Alcohol Amylicum, *D.* Fusel Oil. Oil of Potato-Spirit. Hydrated Oxide of Amyle.

Take of the light liquid which may be obtained (at any large distillery) by continuing the distillation for some time after the pure spirit has been all drawn off, any convenient quantity. Introduce it into a small still or retort, connected with a condenser, and apply heat, so as to cause distillation. As soon as the oil begins to come over unmixed with water, the receiver should be changed; and the distillation being resumed and carried nearly to dryness, the desired product will be obtained. The liquid drawn over during the first part of the distillation will consist of an aqueous fluid, surmounted by a stratum of the fusel oil; this latter, though impregnated with a minute quantity of water, should be separated and preserved, as being sufficiently pure for use.

Remarks. — Fusel oil is an organic compound, which consists of $C^{10}H^{12}O^{2}$; and is considered to be a hydrated oxide of an imaginary base, or "radical," termed Amyle, which consists of $C^{10}H^{11}$. The theoretical constitution of this fluid is, therefore, $C^{10}H^{11}O+HO$, or hydrate of the oxide of Amyle. It is only produced towards the close of the distillation of spirit, and was first noticed in that obtained from potatoes, from which it took its name of oil of potato-spirit.

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* Mat. Med. 3d ed.

Properties.—Fusel oil is a colourless, oily fluid; sp. gr. ·812. It has a strong, nauseous odour, and its vapour produces stupefying effects. It is not used medicinally; but is introduced into the Ph. Dub. for the purpose of obtaining valerianic acid, for making the valerianate of soda.

When treated as is there mentioned (p. 609.), it is converted into $C^{10}H^{9}O^{3}$, which is the composition of valerianic acid, the smell and chemical characters of which it acquires. It remains to be proved by experience whether organic compounds, such as this, which are, what may be called, manufactured, agree in medical as well as in chemical properties with the natural organic bodies which they imitate, as obtained from their natural source. Experience has not yet had time to prove whether the valerianic acid thus made, corresponds in its effects with the acid as distilled from the valerian root.

OLEUM ORIGANI, *E.*

Oil of Marjoram.

ORIGANUM VULGARE (Didynamia Gymnospermia; Labiatæ).

Description.—Origanum or marjoram is an indigenous, small, flowering plant, having light purple, labiate flowers. It is *stimulant* and *carminative;* and an infusion of the whole herb is popularly used in *chronic cough*, *asthma*, and *amenorrhœa.*

The volatile oil is *acrid* and *stimulant*, and forms an ingredient in stimulating liniments for chronic rheumatism, sprains, paralysis, &c.

OLEUM ROSMARINI, *L.*

Oil of Rosemary.

ROSMARINUS OFFICINALIS (Diandria Monogynia; Labiatæ).

Description.—The tops of rosemary are the officinal part, from which the oil is distilled; they have a strong, peculiar odour. The plant is *carminative* and *mildly stimulant;* it is rarely used internally, but is sometimes made into tea, and taken by hypochondriacal persons. The *oil* is *stimulant*, and enters into stimulant liniments. The perfume, Hungary water, contains rosemary as a principal ingredient.

Officinal preparations.—Spiritus Rosmarini. Oleum Rosmarini. Lin. Sapon. co.

OLEUM SABINÆ, *L. D. E.*

Oil of Savine.

Properties of the oil.—Violent *irritant; emmenagogue.* Applied to the skin, the oil causes redness or ulceration. Taken internally, in large doses, it occasions violent vomiting, purging, and in some cases, abortion. It appears to possess a peculiar power of stimulating the uterine vessels, and the venous system generally, inducing enlargement of the liver and an increased secretion of the bile.

Uses.—Savine is frequently used to cause *abortion*, and in some instances has produced this effect; but its action is very uncertain, and is always accompanied with great danger. It has occasioned the death of the mother in two or three instances. As an emmenagogue in *amenorrhœa* and *chlorosis*, Pereira states that the oil is more efficient than any with which he is acquainted: and that he never saw any bad effects from its use in medicinal doses.

Dose.—As an emmenagogue, ♏ij to ♏vi of the oil, in some mucilaginous fluid. This is the only medicinal purpose for which it is internally administered. As much as ♏c have been taken to produce abortion, but without having that effect.

OLEUM SUCCINI, *D.*

Oil of Amber.

Description.—Amber is a pale yellow substance, which becomes electric when rubbed, and burns with a yellow flame. It is found on the shores of the Baltic, and shows that it has a vegetable origin by the remains of portions of coniferous matter embedded in its substance. When distilled, it yields a volatile oil, oleum succini, the only constituent which is employed in medicine.

Composition.—Volatile oil, succinic acid, and resin.

Properties and uses.—*Stimulant;* but it is not used internally. It is not now contained in any officinal preparation, having been omitted in the present edition of the Ph. L. from the tinctura ammoniæ comp., of which it was formerly an ingredient.

OLEUM TEREBINTHINÆ PURIFICATUM, *L. D. E.*

Purified Oil of Turpentine.

Synonyme. Oleum sive Spiritus Terebinthinæ.

Take of Oil of turpentine, a pint.
Water, four pints.
Distil as long as oil comes over with the water.

Description.—Oil or spirits of turpentine is a colourless volatile liquid, having a peculiar, pungent odour. It burns with a bright light, and emits a very large quantity of smoke. It is obtained from common turpentine by distillation; the vapour which passes over, being condensed, constitutes the ol. terebinthinæ, and the dry mass which remains in the retort is common resin.

General medicinal properties.— Stimulant; diaphoretic; anthelmintic; purgative; diuretic; rubefacient.

Characteristic effects —When taken in small or medium doses (♏x to fʒj or fʒij), it excites the pulse; produces warmth in the stomach; causes diaphoresis; an increased flow of urine, sometimes accompanied with strangury; and increased peristaltic action, with the expulsion of flatus. Though a full dose is very efficient in relieving flatulency, the repeated use of small ones sometimes occasions this symptom, which may be removed by the employment of a single large dose. Both the breath and perspiration acquire a terebinthinate odour, and the urine possesses a strong smell of violets; this latter effect is frequently noticed in ten or fifteen minutes, if a person is exposed to the vapour of oil of turpentine, though none of the liquid may have been swallowed. When taken in a large dose (f℥ss to f℥j or f℥ij), it produces all the above effects in a higher degree, but its action upon the bowels is more marked than upon any other organ; when this is not the case, it often produces symptoms of intoxication, with considerable cerebral disturbance. Its use is objectionable where there is irritation of the urinary organs; which it is liable to increase, or even to excite *de novo*. When applied locally, it produces, in from fifteen to thirty minutes, intense burning pain in the skin, and acts as a very efficient rubefacient and counter-irritant; the burning pain, which sometimes continues for some hours, is best relieved by smearing the skin with olive oil. It sometimes occasions discolouration of the skin if too long applied, which I have known to remain for several weeks, but ultimately to disappear.

Effects of the vapour of oil of turpentine.— This oil is now extensively used in the manufacture of india rubber goods, and its effects upon the workmen are strongly marked. "In a large manufactory in New York, two-thirds of the work-people suffer considerable vesical irritation, strangury, vertigo, nausea, &c., during the first few months, after which they become 'seasoned' to it, so that the terebinthine atmosphere no longer affects them. It is the practice of those who suffer thus, to take large and frequent doses of olive oil as a remedy." A similar report is made as to its effects, and those produced by camphine vapour, in the manufactories in New Jersey, and New England. Excessive vesical irritation, dysuria, and the other symptoms named above, are common in hot weather amongst people employed in unlading cargoes of turpentine.—Dr. Harris, *New York Jour. Med.*, in the *Ass. Med. Jour.*, Feb. 1854, p. 112.

Medicinal uses.—Anthelmintic. In doses of at least f℥ss to f℥j or f℥jss for adults, it causes both the death and the expulsion of tape-worms. The turpentine enema is a very efficient remedy for the small thread worms (Ascaris vermicularis). In *chronic discharges from mucous surfaces*, as *chronic bronchitis*, *diarrhœa*, or *dysentery;* and in *gonorrhœa* or *gleet*, it is very useful in small doses (♏x to fʒj), but it must not be employed in the early stages of these diseases. In *chronic catarrh of the bladder* it is sometimes useful. In *passive* or *atonic hæmorrhages* from mucous surfaces, it is highly extolled, and it has been used with benefit in *purpura hæmorrhagica*, and in passive hæmorrhage from the bowels, in fever. In the *low typhoid form* of *puerperal fever* it has been very strongly recommended; and in some epidemics of this disease it has been eminently beneficial in doses of fʒss to fʒj or fʒij, several times daily. In the more inflammatory form it is applied externally to the abdomen as a counter-irritant, and is used as an enema to expel the flatus. In the *flatulent, distended abdomen* which occurs a few weeks or months after delivery, f℥ss with an equal quantity of castor oil, and the application of a bandage, effects a speedy cure. "In the *subsultus* of *fevers*, and in some forms of *convulsions* in *children*," Dr. Graves remarks, "I have frequently employed it, and can bear ample testimony to its value."* In *epilepsy* and in *sciatica* it has frequently proved of benefit. In *atonic dropsies*, in leucophlegmatic habits, and in the first stage of *acute hydrocephalus*, Dr. Copland has found it of use. In *arthritic iritis*, Mr. Guthrie strongly recommends it, in doses of fʒj, thrice daily; and in *rheumatic inflammation of the sclerotic* it is frequently of great service in doses of ♏xxx three times a day. In *chronic rheumatism* it is constantly employed, externally, as a liniment; and is occasionally useful when taken internally, in medium doses. *Externally*, it is applied for a few minutes, to a burnt or scalded surface, on Mr. Kentish's recommendation, before the other dressings are applied; the effect produced is the best guide as to the length of time it should be continued. In adults it quickly produces alleviation of the pain, and, when this is effected, its further application is not beneficial. It should not be retained upon a child's skin more than ten minutes.

Composition.—Fresh and pure oil of turpentine contains no oxygen. It consists of $C^{20}H^{16}$; but it soon absorbs oxygen from the air. Nitric acid converts it into resin; with hydrochloric acid it forms a crystalline compound, called artificial camphor.

Doses and administration.—The dose (small) is from ♏x to fʒj; (medium) fʒj to fʒij or fʒiij; (full) f℥ss to f℥j or f℥ij, or even f℥iij. The use of these doses, respectively, is noticed more fully in the medicinal uses above. It may be administered either floating upon some carminative water, to which some hot aromatic tincture has been added, or it may be taken by itself. It is frequently given combined with an equal quantity of castor oil, or made into an emulsion with mucilage or yolk of egg.

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* Med. Gaz. vol. xxiii. p. 109.

PILULÆ.

PILLS.

Remarks.—The pill masses were formerly called pilul*æ*, they are now called pilul*a*; they were formerly made up with hard soap, but are now compounded with soft soap, and treacle is substituted for syrup, by which changes the mass remains softer than it used to do.

PILULA ALOËS COMPOSITA, *L.D.*

COMPOUND PILLS OF ALOES.

Synonyme. Pilulæ ex Aloë. Pilulæ Aloës compositæ.

Take of Aloes (Socotrine, *L.*; hepatic, *D.*), powdered, an ounce.
Extract of gentian, half an ounce.
Oil of caraway, forty minims (♏xxx, *D.*).
Treacle, as much as may be sufficient.

Beat them together that they may be intimately mixed into a mass suitable for making pills.

Medicinal use.—*Purgative; stomachic*, in habitual costiveness.

Dose.—Gr. v to gr. xx.

Remarks.—Aloes is powdered with difficulty, adhering obstinately to the sides of the pestle and mortar; the powder also which rises from it is very irritating to the nose. If two or three drops of olive oil are dropped upon an ounce of aloes before beginning to grind it, all these difficulties are obviated without interfering with its reduction to powder.

PILULÆ ALOËS, *E.*

Take of Aloes (Socotrine, East Indian, or hepatic) and Castile soap, equal parts.
Conserve of red roses, a sufficiency.

Mix.

Properties and uses.—*Purgative;* acts slowly and chiefly upon the large intestines.

Dose.—Gr. v to gr. xv.

PILULÆ ALOËS ET ASSAFŒTIDÆ, *E.*

Take of Aloes (Socotrine or East Indian), Assafœtida, and Castile soap, equal parts.
Conserve of red roses, a sufficiency.

Mix.

Properties and uses.—*Purgative* and *emmenagogue.* The assafœtida promotes its action upon the bowels in the flatulent constipation of chlorotic women. This pill is sometimes covered with silver leaf, which, however, soon becomes black.

Dose.—Gr. v to gr. xv.

PILULÆ ALOËS ET FERRI, *E.*

Take of Sulphate of iron, three parts.
Barbadoes aloes, two parts.
Aromatic powder, six parts.
Conserve of red roses, eight parts.
Mix.

Properties and uses.—*Purgative; tonic;* and *emmenagogue.* When constipation is conjoined with debility and chlorosis, the addition of the iron is valuable. The stools are blackened by the pill.

Dose.—Gr. v to gr. xv.

PILULA ALOËS CUM MYRRHA, *L. D. E.*

PILLS OF ALOES AND MYRRH.

Synonyme. Pilulæ Rufi.

Take of Aloes (Socotrine or hepatic), powdered, half an ounce.
Saffron; Myrrh, powdered; and Soft soap, of each, two drachms.
Treacle, as much as may be sufficient.
Beat them together that a mass may be made.

D. Hepatic aloes, ℥ij; Myrrh, ℥j; Saffron, ℥ss; Treacle, by weight, ℥ijss.

E. Aloes, Socotrine or East Indian, four parts; Myrrh, two parts; Saffron, one part; Conserve of red roses, a sufficiency.

Remarks.—This pill differs from that of the last Pharmacopœia in the addition of the soft soap, which makes the mass of a better consistence. It was formerly so hard after being mixed a short time, that it was almost impossible to divide it into pills.

Properties and uses.—*Purgative and emmenagogue.* The myrrh and saffron promote the action of the aloes upon the pelvic viscera, and are supposed to act upon the uterus as well as the rectum.

It is still commonly known as pil. rufi, and is a popular as well as professional purgative in chlorosis and amenorrhœa.

Dose.— Gr. v to gr. xv.

PILULA ALOËS CUM SAPONE, *L.*

Aloes and Soap Pills.

Take of Extract of Barbadoes aloes, powdered; Soft soap; and Extract of liquorice, equal parts.
Treacle, as much as may be sufficient.

Beat the extract of aloes with the soap; then, the other things being added, beat them all together that a mass may be made.

Properties and uses.—*Purgative.* The soap increases the solubility of the aloes, and promotes its activity as a purgative.

Dose.—Gr. v to gr. xv.

PILULÆ ASSAFŒTIDÆ, *E.*

Take of Assafœtida, Galbanum, and Myrrh, of each, three parts.
Conserve of red roses, four parts, or a sufficiency.

Mix.

Properties and uses.—Identical with those of pil. galb. co. Ph. L., which see.

Dose.—Gr. v to gr. xv.

PILULÆ ASSAFŒTIDÆ COMPOSITÆ, *D.*

Take of Assafœtida, two ounces.
Galbanum, Myrrh, and Treacle, of each, one ounce.

Mix.

Properties and uses.—Identical with the pil. assaf. Ph. Ed. and the pil. galb. co. Ph. L., which see.

Dose.—Gr. v to gr. xv.

PILULA CAMBOGIÆ COMPOSITA, *L. E.*

Compound Camboge Pills.

Synonyme. Pilulæ Cambogiæ, *E.*

Take of Camboge, powdered, two drachms.
Aloes (Socotrine or hepatic), powdered, three drachms.
Ginger, powdered, a drachm.
Soft soap, half an ounce.

Mix the powders together; afterwards, the soap being added, beat the whole together until incorporated.

E. Gamboge, East Indian or Barbadoes aloes, Aromatic powder, of each, one part; Castile soap, two parts.

This pill differs from that of the last Pharmacopœia, in containing soft soap, which prevents it from becoming so hard as the old one.

CAMBOGIA.

Garciniæ (various undetermined species), Monœcia Monadelphia; Guttiferæ.

Description and varieties.—Camboge or gamboge is obtained by breaking the small twigs and leaves of the tree, when a yellow juice exudes in drops, which is collected and dried, or is poured, whilst still soft, into bamboo canes, in which it hardens. It is brought to England in two forms, either in cakes enveloped in leaves, or in rolls, which are marked externally by the ridges in the interior of the bamboo from which it has received its form; these rolls consist of finer camboge than that which is imported in cakes, and are sometimes hollow internally.

Composition.—The composition and characters of gamboge are of considerable importance, in consequence of death having occurred in some instances from its administration. It consists, principally, of *resin* or *gambogic acid* (70 per cent.) and *gum* and *water* (30 per cent.). Gambogic acid ($\overline{Gamb}$) is not soluble in water, but is readily soluble in alcohol, and still more so in ether; it combines with potash, forming a deep yellow salt; when this is added to solutions of salts of lead, iron, or copper, it forms a deep yellow precipitate with the first ($PbO,\overline{Gamb}$); a dark brown with the second, ($FeO,\overline{Gamb}$); and a brown with the third ($CuO,\overline{Gamb}$).

Adulteration.—If starch is present, it is an adulteration. Gamboge is frequently employed to adulterate the compound extract of colocynth.

Medicinal properties. — *Drastic hydragogue cathartic.* In small doses it produces watery stools, and increases the flow of urine, the latter being especially the case if the gamboge is combined with carbonate of potash. It almost always causes griping. In large doses its operation is very severe. It occasions nausea, vomiting, excessive discharge of watery stools, great prostration, and, if persevered in, ultimately death. In these cases the bowels have been found inflamed, ulcerated, and gangrenous. Sundelin considers it to have an especial power of exciting the vascular system of the pelvic organs. It is very soluble in the juices of the stomach, and hence is liable to cause vomiting, unless it is combined with some substance which is less readily dissolved; with this view aloes are usually prescribed along with it, as in the compound gamboge pill. It is inferior in activity and violence to elaterium or croton oil, but exceeds scammony, colocynth, or jalap in these respects. It is the chief ingredient in Morison's pills.

Characteristics as a purgative.—Gamboge operates quickly, causes much griping, nausea, and watery stools; acts chiefly upon the small intestines, and is liable to excite inflammation and ulceration, if long continued. If repeatedly administered, its purgative influence rapidly diminishes, and the dose must be increased.

Uses.— As an ordinary aperient in common *constipation*, the compound pill is prescribed in doses of gr. v to gr. x. In *dropsies* it is given combined with jalap or cream of tartar, to promote its hydragogue effects. It should be combined with carbonate of potash if it is wished to act upon the kidneys at the same time. It is thought to act most beneficially in dropsies dependent upon hepatic obstruction. In *cerebral affections* or *determination of blood to the head*, it is employed as a revulsive, to excite a counteraction in the abdominal viscera. It has been frequently used with success for the *expulsion of tape-worms.*

Its administration should be avoided when the stomach or bowels are very irritable, or when there is a tendency to abortion or to uterine hæmorrhage.

Dose.— Gamboge ought never to be prescribed alone; in combination with other remedies it is given as a common aperient in doses of gr. j to gr. iv; where a more decided action is required, this quantity may be repeated every three or four hours, for five or six times. If long persisted in, it loses its purgative effects upon the bowels, and much larger doses are then required; but this is objectionable, as it still produces injurious consequences in other respects.

PILULÆ CALOMELANOS COMPOSITÆ, *D.E.*

D. Calomel, Precipitated sulphuret of antimony, of each, ʒj; Guaiacum resin, ʒij; Castor oil, fʒj. Triturate the calomel with the antimony, then add the resin and oil, and beat the whole into a uniform mass.

E. Calomel, Golden sulphuret of antimony, of each, one part; Guaiac and treacle, of each, two parts. Mix.

Properties and uses.—Identical with those of the pil. hydrarg. chlor. co. of the Ph. L.

Dose. — Gr. vi every night, or oftener, according to the object with which they are given.

PILULÆ CALOMELANOS ET OPII, *E.*

Take of Calomel, three parts.
Opium, one part.
Conserve of red roses, a sufficiency.

Mix, and divide into pills containing two grains of calomel each, (each pill will, therefore, contain two-thirds of a grain of opium).

Properties and uses. — Given to excite salivation, the opium causing the mercury to be retained in the system; or to allay the diarrhœa and tenesmus at the commencement of an attack of English cholera; or in any other case in which both calomel and opium are required.

Dose. —When divided according to the directions of the Ph. Ed., each pill contains gr. ij of calomel, and gr. ½ of opium. The dose must be according to the object in view.

PILULÆ COLOCYNTHIDIS, *E.*

Take of Socotrine or East Indian aloes, and Scammony, of each, eight parts.
Colocynth, four parts.
Sulphate of potash, and oil of cloves, of each one part.
Rectified spirit, a sufficiency.

Pulverise the aloes, scammony, and sulphate of potash together; mix with them the colocynth previously reduced to fine powder; add the oil of cloves, and with the aid of a small quantity of rectified spirit beat the whole into a proper pill mass, which is to be divided into five-grain pills.

PILULA COLOCYNTHIDIS COMPOSITA, *L. D. E.*

COMPOUND COLOCYNTH PILL.

Synonyme. Extractum Colocynthidis compositum, *Ph. L.* 1836.

Take of Extract of colocynth, one drachm.
Extract of aloes, powdered, six drachms.
Scammony, powdered, two drachms.
Cardamoms, powdered, half a drachm.
Soft soap, one drachm and a half.

Mix the powders together; then, the other things being added, beat them all together that a mass may be made.

D. Colocynth pulp, in powder, ℥j; Hepatic aloes, ℥ij; Scammony, Castile soap, of each, ℥j; Oil of cloves, fʒj; Treacle, by weight, ʒx. Mix.

Remarks.— This pill differs from the compound extract of colocynth of the old Pharmacopœia, with which, in other respects, it closely corresponds, in containing soft soap, which prevents it from becoming so hard, when kept, as the extract was liable to do; if it does become too hard to be easily made into pills, the addition of two or three drops of rectified spirit instantly softens it, and causes it to fall into a soft powder in a few minutes.

Properties and uses. — See EXTRACT. COLOC. CO. p. 316.

Dose. — Gr. iv to gr. x. It is seldom given alone, but is generally prescribed along with two or three grains of calomel. As it is liable to gripe, the Ph. Ed. has provided a valuable addition in the following formula. (See PIL. COLOC. ET HYOSCYAM.)

PILULÆ COLOCYNTHIDIS ET HYOSCYAMI, *E.*

Take of Colocynth pill mass, two parts.
Extract of hyoscyamus, one part.

Beat them well together, adding a few drops of rectified spirit, if necessary; and divide the mass into five-grain pills.

Properties and uses. — The hyoscyamus corrects the tendency to griping of the colocynth, and, at the same time, rather assists than hinders its purgative action. It is a valuable combination.

Dose. — Gr. v to gr. x.

PILULA CONII COMPOSITA, *L.*

COMPOUND PILL OF HEMLOCK.

Take of Extract of hemlock, five drachms.
Ipecacuanha, powdered, a drachm.
Treacle, as much as may be sufficient.

Beat them together that a mass may be made.

Properties and uses. — If the extract of hemlock is good, this is an excellent pill for spasmodic cough, bronchitis, and the incipient stage of phthysis, or any case in which it is desirable to give a cough pill which shall not produce the vascular excitement, and other objectionable effects of opium.

Dose. — Gr. v, twice or thrice daily.

PILULÆ CUPRI AMMONIATI, *E.*

Take of Ammoniated copper, in fine powder, one part.
Bread crumb, six parts.
Solution of carbonate of ammonia, a sufficiency.

Beat them into a proper mass, and divide it into pills, containing each half a grain of ammoniated copper.

Remarks.—If long made, the pills are liable to become very hard, and the ammoniated copper also becomes changed from long exposure to the air; they ought, therefore, only to be made when prescribed, and a large number should not be ordered at once.

Properties and uses.— *Tonic and antispasmodic.* Chiefly used in *epilepsy.* (See CUPRI AMMONIO-SULPHAS, p. 443.)

Dose. — Gr. iv, which contain half a grain of the copper salt, three times daily, for a considerable time.

PILULÆ DIGITALIS ET SCILLÆ, *E.*

Take of Digitalis and Squill, of each, one part.
Aromatic electuary, two parts.

Beat them into a proper mass with conserve of red roses, and divide the mass into four-grain pills.

Properties and uses.—*Diuretic.* The proportion of digitalis is greater than some practitioners think safe, but, if carefully watched, the effect need not be feared.

A combination of different remedies of the same general properties acts more favourably and uniformly than a single one, even though in itself stronger than some of those combined with it; and on this principle the squill is added to the digitalis, being a diuretic itself, though weaker than the foxglove.

See INFUSUM DIGITALIS, p. 353., and OXYMEL SCILLÆ, p. 378., for the properties and uses of the two medicines.

Dose.— Gr. iv, repeated according to its effects.

PILULÆ FERRI CARBONATIS, *E.*

Take of the Saccharine carbonate of iron, four parts.
Conserve of red roses, one part.
Mix, and divide them into five-grain pills.

Properties and uses.—*Tonic.* See FERRI CARB. SACCHAR. p. 457.

Dose.— Gr. v; a much larger dose cannot often be borne.

PILULA FERRI COMPOSITA, *L.*

COMPOUND PILLS OF IRON.

Take of Myrrh, powdered, two drachms.
Carbonate of soda,
Sulphate of iron,
Treacle, of each, a drachm.

Rub the myrrh with the carbonate in a vessel first heated (*with boiling water*); then the sulphate (*first powdered*) being added, rub them again; lastly, beat them all together that a mass may be made.

Remarks.— The directions in the present Pharmacopœia are a great improvement over those in the old one; but the following are still better:—

Rub the sulphate and carbonate, separately, to powder; then heat the mortar by pouring boiling water into it, and, whilst still hot, throw in the powdered carbonate of soda; it will quickly melt, and, whilst liquid, rub the sulphate also with it, which will likewise melt and form a dark green, soft mass, which soon loses its perfect fluidity; rub in the myrrh quickly, and add rather less than the prescribed quantity of treacle: spread out the soft mass for a short time in the air, when it will harden sufficiently to be made into pills.

Process.— This process, of which the new one in the Pharmacopœia is a modification, was first suggested by Mr. Southall of Birmingham, and possesses many advantages. If the mortar is heated to 150° F. or upwards, the carbonate of soda, when thrown into it, is dissolved in its own water of crystallisation; when the sulphate of iron is added to this, it likewise is dissolved, and double decomposition ensues: the carbonic acid leaves the soda to combine with the iron, and the sulphuric acid leaves the iron to combine with the soda, and sulphate of soda and carbonate of iron are formed. (See Ferri Sesquiox. p. 452.) To this still liquid mixture, the powdered myrrh is added, and the whole is mixed with a small quantity of treacle.

The advantages of this plan over the old one are, that the iron remains for a much longer period in the active form of carbonate, and that the bulk of the pills is lessened; both which circumstances may be thus explained:—When carbonate of soda and sulphate of iron are simply rubbed to powder, as in the old method, they do not entirely lose their crystalline form; some of their particles still remain angular, and have an appreciable size; they, therefore, do not come perfectly in contact with each other, but minute interspaces exist between them when they are mixed; the iron is imperfectly converted into carbonate, and the change does not stop here: air finds its way through every part of the mass, by means of the minute interspaces, and the iron quickly loses its carbonic acid, absorbs more oxygen from the air, and is converted into the insoluble and comparatively inert sesquioxide. When, on the contrary, the two salts are dissolved in their own water of crystallisation, the crystalline form is entirely lost; and when the powdered myrrh and treacle are added, a compact, perfectly impervious, soft mass is formed, the outside of which is converted into sesquioxide, whilst the interior remains as the active carbonate. From this same close approximation of the particles, the bulk of the pill mass is reduced nearly one half. In comparative experiments upon these two plans, some years since, I found that at the end of twelve months a mass weighing three drachms, made in the new way, was still green except just on the outside, and effervesced freely on the addition of hydrochloric acid; whilst a mass of the same weight, made at the same time by the old plan, was nearly twice the size; was perfectly brown throughout in less than six weeks, and did not produce the slightest effervescence on the addition of hydrochloric acid.

It is probable that the more intimate mixture of the treacle with the carbonate of iron favours its permanency (see Ferri Carb. Sacchar. p. 457.); but I do not think this to be the important part of the process, since treacle was employed in the old plan, and the carbonate of iron is, notwithstanding, converted into sesquioxide.

Medicinal properties and uses.—This pill has long been in use, and is a most valuable *tonic*, and is also called *emmenagogue;* but its powers in this respect are simply owing to its tonic properties. It may be given in any case of debility in which the internal use of iron is indicated; but it is chiefly employed, and with the most beneficial effects, is chlorosis; in which disease there is a marked deficiency of the iron that should naturally exist in the blood, as is indicated by the general pallor, showing the want of red particles: in this case, experience preceded our hypothetical opinions, which is more than can be said of many fashionable theories of the day. This pill is contra-indicated when there is plethora, even though it should be accompanied with amenorrhœa.

Like all preparations of iron, this pill communicates a black tinge to the fæces.

Dose.— Gr. v, twice or three times daily; or gr. x, once in the day.

PILULÆ FERRI SULPHATIS, *E.*

Take of Dried sulphate of iron, two parts.
Extract of taraxacum, five parts.
Conserve of red roses, two parts.
Liquorice-root powder, three parts.
Mix, and divide into five-grain pills.

Properties and uses. — *Tonic;* it is sometimes slightly *laxative* also. Used in *chlorosis.*

Dose. — Gr. v to gr. x.

PILULA GALBANI COMPOSITA, *L.*

COMPOUND PILLS OF GALBANUM.

Synonyme. Pilulæ Gummosæ. Pilulæ e Gummi. Pilulæ Galbani compositæ.

Take of Galbanum, prepared, Soft soap, of each, two drachms.
Myrrh, Sagapenum, prepared, of each, three drachms.
Assafœtida, prepared, a drachm.
Treacle, as much as may be sufficient.
Beat them together that a mass may be made.

Remarks. — This pill is liable to become very hard when kept. It may be softened again by being beaten with a few drops of spirit, in a mortar heated by boiling water poured into it. To make it properly, a heavy mortar and pestle are necessary, as severe beating is requisite to mix the ingredients thoroughly.

Dose.— Of the pill, gr v to ℈j.

Medicinal use.— See below.

GALBANUM OFFICINALE (Pentandria Digynia; Umbelliferæ).

Description. — Galbanum is said to be obtained by making incisions into the plant a few inches above the root, from which the juice exudes, and in a few hours becomes dry. It is met with in two forms: *tears*, which are scarce; and *lump*, which consists of agglutinated tears; this has a mottled appearance, being generally dark, but having light spots in various parts. Sometimes it occurs in irregular masses, intermixed with wood and seeds, and has a much softer character.

Substances for which galbanum may be mistaken.— In its general appearance it resembles *sagapenum*. Galbanum is not quite so soft, and may be easily distinguished by having a much less powerful odour of assafœtida than sagapenum possesses.

Properties.— Galbanum agrees in its general properties with the gum-resins. It is *stimulant* and *antispasmodic*. It is less powerful than assafœtida, but is stronger than ammoniacum. It is supposed to exert a specific influence over the uterus. When externally applied in the form of plaster, it is a useful stimulant to chronic indolent swellings.

Constituents.— *Volatile oil, gum, and resin.*

Uses. — As a stimulant in relaxed and torpid habits; and, in chlorosis and hysteria, it is generally combined with assafœtida. It is often of use in chronic catarrh, to check the excessive mucous or pituitous secretion. The tincture, applied by pledgets to the closed eyelids, is said to be useful in scrofulous ophthalmia, and in the irritability or weakness of the eyes occasioned by over exertion (*Arnold*, quoted by *Christison*). In the form of plaster, it is usefully applied to indolent tumours.

PILULA HYDRARGYRI, *L.D.E.*

MERCURIAL PILL.

Synonyme. Pilulæ Mercuriales. Pilulæ Hydrargyri. Blue Pill.

Take of Mercury, half an ounce.
Confection of (red) rose, six drachms.
Liquorice, powdered, two drachms.

Rub the mercury with the confection, until globules can no longer be seen; then, the liquorice being added, beat them all together, that a mass may be made.

Remarks. —By long continued trituration the mercury is minutely divided, and is also, in some degree, oxidised, but the proportion of oxide varies considerably, as I have found it to range between gr. 0·134 and gr. 0·78 per cent.* This preparation may be accidentally very powerful, by the unintentional formation of subsulphate of mercury, which happens if sulphuric acid has been added to the confection of roses to give it a fine red colour; but this is rather a possible than a probable accident, as no case of its occurrence has been recorded for many years. Globules ought not to be visible when the pill is rubbed upon white paper, or upon the finger.

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* Pharm. Journ. March, 1845.

Properties and uses. — *Purgative; alterative.* In large doses, gr. x to gr. xv, it acts as a purgative, and promotes the biliary secretion, or its excretion, from the gall bladder. In small doses, gr. v, repeated twice or three times daily, it is commonly used to bring the system under the influence of mercury. If it acts too much upon the bowels, a small quantity of opium may be added to each pill. When employed as a purgative, it should be followed by an aperient draught the next morning. It is less liable to disorder the stomach than calomel.

Dose. — As a purgative, gr. v to gr. x, followed in a few hours by an aperient. To excite salivation, gr. iv or gr. v, twice to six times daily, either with or without opium, according to its effects upon the bowels.

Proportion of mercury contained in it. — Three grains contain one grain of mercury.

PILULA HYDRARGYRI CHLORIDI COMPOSITA, *L.*

COMPOUND PILLS OF CHLORIDE OF MERCURY.

Synonyme. Pilulæ Hydrargyri Submuriatis. Pilulæ Plummeri.

Take of Chloride of mercury,
Oxysulphuret of antimony, of each, two drachms.
Guaiacum (resin), powdered,
Treacle, of each, half an ounce.

Rub the chloride with the oxysulphuret, and afterwards with the guaiacum and treacle, that a mass may be made.

Medicinal uses. — *Alterative.*

Dose. — Gr. v to gr. x. This pill is much employed in cutaneous eruptions, and in secondary syphilitic symptoms, particularly when affecting the skin. It is commonly known by the name of *Plummer's pill.*

PILULA IPECACUANHÆ CUM SCILLA, *L.*

PILLS OF IPECACUANHA AND SQUILL.

Synonyme. Pilulæ Ipecacuanhæ compositæ, *Ph. L.* 1836.

Take of Compound powder of ipecacuanha, three drachms.
Squill, freshly powdered,
Ammoniacum, powdered, of each, a drachm.
Treacle, as much as may be sufficient.

Beat them together, that a mass may be made.

Medicinal properties and uses.—Expectorant, and slightly *sudorific* and *sedative*. It is a very useful cough pill, in chronic *bronchitis*. The ammoniacum renders it too stimulating for the acute stage of this disease.

Dose.—Gr. v, three times daily, or gr. x at night. Five grains contain about a quarter of a grain of opium.

PILULÆ IPECACUANHÆ ET OPII, *E.*

Take of the Powder of ipecacuanha and opium, three parts.
Conserve of red roses, one part.
Mix, and divide into four-grain pills.

Remarks.—Each pill contains nearly one-third of a grain of opium, and as much ipecacuanha.

Uses.—See Pulv. Ipec. co.

Dose.—Gr. iv to gr. xx. The usual fault is not giving enough.

PILULÆ OPII, SIVE THEBAICÆ, *E.*

Take of Opium, one part.
Sulphate of potash, three parts.
Conserve of red roses, one part.
Mix.

Uses.—The same as those of opium.

Dose.—According to the quantity of opium wished for. Five grains contain one grain of opium.

PILULÆ PLUMBI OPIATÆ, *E.*

Lead and Opium Pills.

Take of Acetate of lead, six parts.
Opium, one part.
Conserve of red roses, about one part.
Mix, and divide into four-grain pills. Four grains contain half a grain of opium and three grains of acetate of lead.

Properties and uses.—This is a very valuable pill in *chronic diarrhœa*, when there is not much straining, but the stools continue frequent and watery; if blood is present under these circumstances, it is peculiarly valuable. It may also be given to check hæmorrhage from the lungs or any internal organ; and to check excessive sweating.

Dose.—Gr. iv, repeated four or five times a day, until the desired effect is produced. In my own experience, I have generally found half this quantity of opium a better proportion.

PILULÆ RHEI, *E.*

Take of Rhubarb, nine parts.
Acetate of potash, one part.
Conserve of red roses, five parts.
Mix, and divide into five-grain pills.

Remarks. — An exceedingly mild aperient pill.

Dose. — Gr. v to gr. x.

PILULA RHEI COMPOSITA, *L. D. E.*

Compound Pills of Rhubarb.

Take of Rhubarb, powdered, four drachms.
Socotrine aloes, powdered, three drachms.
Myrrh, powdered, two drachms.
Soft soap, half a drachm.
Oil of caraway, fifteen minims.
Treacle, as much as may be sufficient.

Mix the powders together; then, the other things being added, beat them all together, that a mass may be made.

D. Rhubarb, ℥jss; Hepatic aloes, ʒix; Myrrh, Castile soap, of each, ʒvi; Oil of peppermint, fʒj; Treacle, by weight, ℥ij.

E. Rhubarb,'12 parts; Aloes, 9 parts; Myrrh and Castile soap, of each, 6 parts; Oil of peppermint, 1 part; Conserve of red roses, 5 parts.

Remarks.—The Phs. Dub. and Ed. agree precisely, except in the material with which the pill is made into a mass; the one employing treacle, and the other conserve; but though both of them agree also in all essentials with the Ph. L., yet the use of oil of caraway in the Ph. L., and of peppermint in the others, causes such a difference in flavour as to occasion a suspicion of error, should they be dispensed for one another when the patient happens to be on a journey.

The Ph. L. now orders soft instead of hard soap, and treacle instead of syrup, which are improvements, as they prevent the mass from becoming too hard on keeping.

Properties. — A useful purgative pill; but it must not be used too constantly, as the rhubarb is liable to produce subsequent constipation.

Dose.—Gr. v to gr. xv.

Botany.—The true species yielding the rhubarb of commerce is still unknown. The Rheum palinatum is extensively cultivated for the sake of its petioles, which are employed in puddings and tarts, and its root furnishes the common English rhubarb.

RHEUM (Enneandria Monogynia; Polygonaceæ).

Description and varieties.—Three kinds of rhubarb are in common use, viz. Turkey, East Indian, and English.

Turkey. This is considered to be the best, and bears the highest price. It is characterised by being in pieces which are generally flat at the ends. No bark is present, but the pieces look as if sliced by longitudinal strokes of a large knife. They are always partially or entirely pierced by a hole, which, in many instances, extends no further than the centre, and is made by order of the Russian government, to ascertain the soundness of the interior; there is, therefore, no necessity for piercing beyond the centre of the piece, and the hole is never filled up. The texture is closer than that of the other varieties, and the red and white streaks are more delicate and defined; its smell also is more delicate. It contains a large amount of crystals of oxalate of lime, which makes it feel gritty between the teeth when chewed. This, though called Turkey rhubarb, is really produced in Tartary, and brought to St. Petersburgh, whence we obtain it.

East Indian. The pieces of this variety are generally more or less conical, being considerably thicker at one end, or in the middle, than at the other. The bark of the root is seldom entirely removed, and the marks of the knife are evident in those portions which remain. From the presence of the bark it has a darker and coarser appearance than the Turkey rhubarb. The pieces are almost always entirely pierced by a small hole, in which may generally be seen the ends of a piece of string, by which the hole is filled. These holes are made with a different intention from those in the Turkey rhubarb; a string is put through them and the pieces are then hung upon the horns of the sheep or cattle to dry, or are suspended in some dry shady place. This kind contains a considerable quantity of oxalate of lime, and is also gritty when chewed. The fine pieces are generally firmer in their structure than the Turkey rhubarb.

English. This is frequently cut and pierced to make it resemble Turkey rhubarb, but it may be distinguished at once by its softness; the centre of the pieces can be easily and permanently indented with the finger nail. It is very light and spongy, and its streaks are pinkish, and not so fine or numerous as in the other kinds. It does not feel gritty under the teeth, and contains very little oxalate of lime.

English stick rhubarb is sold in pieces three or four inches long, and the thickness of a finger.

Composition.—*Rhabarberic acid* or *rhein* (purgative principle), *tannin*, *gum*, and *oxalate of lime*.

Adulterations.—*Gamboge and turmeric*, to hide a mixture of flour or other inert powder. The former is detected by digesting it in ether, and adding a few drops of the solution to water, when an opaque yellow film of gamboge will separate. The latter, if present, is detected by a decoction of the adulterated rhubarb becoming brown or red on the addition of boracic acid.

General medicinal properties. — *Purgative; astringent; tonic; stomachic.*

Characteristic properties. — Very gently purgative. It is liable to produce subsequent constipation, and is frequently useful in checking an obstinate diarrhœa, from its astringent properties. It acts upon the whole course of the bowels, and never causes inflammation of the mucous membrane. Its action is slow. It is absorbed into the system, and the milk of nurses who are taking it, becomes aperient. It colours the urine yellow. In small doses (four to six grains), it promotes the appetite and improves the condition of the stomach in some forms of impaired digestion.

There is not much difference in the medicinal effect of the different kinds of rhubarb.

Medicinal uses. — Rhubarb is very useful when combined with hydr. cum cret. or with magnesia, or liq. potassæ, in the *mesenteric diseases* of children. In mild cases of *diarrhœa* it is given alone. It should be avoided in habitual constipation, in consequence of its astringent effects. The pil. rhei co. is a useful dinner pill, and is a valuable aperient for chlorotic patients.

Rhubarb, burnt in an iron pot and stirred until entirely black, and then extinguished by being closely covered, is said by Dr. Hoblyn, Middlesex Hospital, to check the diarrhœa of phthysis better than chalk mixture or opium: it is tasteless, and is given in doses of gr. v to gr. x.*

Doses. — Of the powder, as a tonic or stomachic, gr. iv to gr. viii; as a purgative, gr. x to gr. xx or gr. xxx. Of the pil. rhei co., gr. v to gr. xv.

PILULÆ RHEI ET FERRI, *E.*

RHUBARB AND IRON PILLS.

Take of Dried sulphate of iron, four parts.
Extract of rhubarb, ten parts.
Conserve of red roses, five parts.
Mix, and divide into five-grain pills.

Properties. — *Aperient* and *tonic.* In some cases, habitual constipation is dependent upon debility, which affects the muscular coat of the bowels as well as the system generally, and in such cases it is more effectually treated by tonics than by purgatives; this pill is adapted for such cases, which are more frequent in women than in men, and are generally accompanied by chlorosis or irregular menstruation.

Dose. — Gr. v to gr. xv or ℈j.

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* Lancet, 1840-41, vol. i. p. 790.

PILULA SAPONIS COMPOSITA, *L. D.*

COMPOUND SOAP PILLS.

Synonyme. Pilulæ Opii. Pilulæ Saponis cum Opio.

Take of Opium, powdered,
Liquorice, powdered, of each, two drachms.
Soft soap, six drachms.
Beat them together, that a mass may be made.

D. Opium, ℥ss; Castile soap, ℥ij; Distilled water, fʒss, or as much as may be sufficient. Reduce the soap to a fine powder, add the opium and water, and beat the mixture into a mass of a uniform consistence.

Remarks. — The present formula, in containing *soft* soap, is a great improvement upon the old one, and upon that of the Ph. Dub., which, from using hard soap, requires long continued and energetic beating to make it into a uniform mass; and when made, it quickly becomes so hard as to be worked up with some degree of difficulty.

An objection is sometimes made to the name of this pill, that it is absurd to call a pill containing so important an ingredient as opium by so trivial a name as soap pill; but this is done intentionally, to conceal the fact of opium being prescribed, in cases in which the patient might object to it.

Dose. — Both the Lond. and Dub. pill is of the same strength, five grains containing one grain of opium; the dose will therefore be according to the quantity of this remedy which is wished for.

PILULÆ SCILLÆ, *E.*

Take of Squill, five parts.
Ammoniac, Ginger, and Spanish soap, of each, four parts.
Conserve of red roses, two parts.
Mix, and divide into five-grain pills.

PILULA SCILLÆ COMPOSITA, *L. D. E.*

COMPOUND SQUILL PILLS.

Take of Squill, freshly powdered, a drachm.
Ginger, powdered,
Ammoniacum, powdered, each, two drachms.
Soft soap, three drachms.
Treacle, as much as may be sufficient.
Mix the powders together; then, the other things

being added, beat them all together, that a mass may be made.

D. Squill, ʒijss; Ginger, Ammoniac, Castile soap, of each, ʒij; Treacle, by weight, ℥ss. Mix.

Remarks.—This pill, though of the same strength and properties as formerly, is softer and more convenient from the use of soft soap and treacle, than of the hard soap and syrup formerly ordered.

Medicinal uses.—*Expectorant.* This is more stimulating than the compound ipecacuanha pill, and is not sedative, as it contains no opium.

Dose.—Gr. v to gr. xv. Large doses are liable to cause nausea. It is only used in the chronic cough of old people, with copious secretion of mucus, or of a more watery fluid.

PILULÆ STYRACIS, *E.*

Take of Opium, Saffron, of each, one part.
Extract of storax, two parts.
Mix, and divide into four-grain pills.

Dose.—Four grains contain one grain of opium.

PILULA STYRACIS COMPOSITA, *L.*

COMPOUND STORAX PILLS.

Take of Storax, prepared, six drachms.
Opium, powdered,
Saffron, of each, two drachms.
Beat them together, that a mass may be made.

Medicinal properties and uses.—Balsamic and slightly *expectorant* in chronic affections of the lungs. The storax adds little to its value, but it is a useful name under which to prescribe opium, without the patient's knowledge.

Dose.—Five grains contain one grain of opium.

PULVERES.

POWDERS.

It is necessary that whatever we order to be reduced to powder should be passed through a fine sieve, that the coarser and larger parts may be separated. And it is desirable that most powders should be freshly prepared, and not long kept.

PULVIS ALOËS COMPOSITUS, *L.*

Compound Powder of Aloes.

Take of Aloes (Socotrine or hepatic), an ounce and a half.
Guaiacum (resin), an ounce.
Compound powder of cinnamon, half an ounce.

Rub the aloes and the guaiacum resin separately to powder; then mix them with the compound powder of cinnamon.

Medicinal properties and uses.—*Purgative* and *sudorific.*

Dose.—Gr. x to gr. xx.

Remarks.—The addition of a few drops of olive oil renders the pulverisation of aloes an easy operation, and prevents annoyance from the irritating powder which rises during the operation.

PULVIS ALOËS CUM CANELLÂ. (Not Off.)

Synonyme. Hiera Picra.

Take of Powdered aloes, one pound.
Powdered canella alba, three pounds.

Mix.

Uses.—Formerly a favourite *emmenagogue*, and still used as a popular remedy under the name of hicry-picry, though not often prescribed by professional men. It is a useful combination of a purgative with an aromatic, and is well adapted for the relief of flatulent constipation in amenorrhœa.

Dose.—Gr. v to gr. xx.

PULVIS ALUMINIS COMPOSITUS, *E.*

Take of Alum, four ounces.
Kino, one ounce.
Mix.

Medicinal properties and uses.—*Astringent.* It may be enveloped in a muslin bag, and used as an astringent pessary in *prolapsus of the uterus*, or may be used in any of the cases mentioned in liquor alum. co. p. 381.

PULVIS ANTIMONIALIS, *D.* See Metallica,—Pulv. Antimonialis, p. 401.

PULVIS AROMATICUS, *D.E.*

Aromatic Powder.

D. Cinnamon, Ginger, of each, ℥ij; Cardamom seeds, freed from their capsules, Nutmeg, of each, ℥j. Mix.

E. Cinnamon, Cardamom seeds, and Ginger, of each, equal parts. Mix.

Medicinal properties and uses.—*Aromatic* and *stimulant.* The nutmeg makes it also slightly astringent, and it is added to astringent mixtures in diarrhœa, or is given alone in colicky flatulence.

Dose.—Gr. xv to ʒss.

PULVIS CATECHU COMPOSITUS, *D.*

Take of Catechu, Kino, of each, two ounces.
Cinnamon, Nutmeg, of each, half an ounce.
Mix.

Medicinal properties and uses.—*Aromatic; astringent.* Chiefly used in simple diarrhœa.

Dose.—Gr. xv to ʒss.

PULVIS CINNAMOMI COMPOSITUS, *L.*

Compound Powder of Cinnamon.

Synonyme. Pulvis Aromaticus, *Ph. L.* 1788.

Take of Cinnamon, two ounces.
Cardamoms, an ounce and a half.
Ginger, an ounce.
Long pepper, half an ounce.

Rub them together, so that a very fine powder may be made.

Properties and uses.—*Aromatic; astringent.* Chiefly added to astringent mixtures in diarrhœa, when there is not much straining, nor blood in the stools.

Dose.—Gr. x to ℈j.

LAURUS CINNAMOMUM (Enneandria Monogynia; Lauraceæ).

Description.—*Cinnamon* is in bundles, composed of the bark of the young branches, which is rolled into quills, enclosed one within another; the bark varies from the thickness of coarse brown paper, to that of Bristol board; some is even thicker than this, but the thin bark is considered the best. Its colour is brown; its odour aromatic; and its flavour, hot, pungent, and aromatic. The flavour is considered to be the best criterion of its value. It is rather tough, and breaks with a *long splintery* fracture.

Characters.—Ph. L. Thin, closely rolled up, the smaller quills being enclosed in the larger ones.

Bark for which it may be mistaken.—*Cassia;* this is generally *thicker*, breaks with a *short*, not a splintery fracture, and has a stronger, but less delicate flavour.

Composition.—*Volatile oil* and *tannin.* When nitric acid is added to this oil, delicate white crystals are formed, and a powerful odour of hydrocyanic acid is evolved. It is very difficult to meet with oil of cinnamon, on account of the expense; oil of cassia being almost always substituted for it, which cannot be distinguished by the above test, as it is similarly affected by nitric acid.

Medicinal properties.—*Aromatic; stimulant;* and *astringent.*

Uses.—In *debility*, *colic*, and *flatulence*, it is used as an aromatic, and is much employed as a condiment. Its astringency induces constipation, and it is frequently added to astringent or chalk mixtures in *diarrhœa.* Cinnamon boiled in milk is a favourite aromatic astringent in popular use, to relieve diarrhœa and general debility. In the low stage of fever it is a good cordial and stimulant. It also checks nausea and vomiting.

Dose and administration.—Of the powder, gr. x to ʒss; of the oil, ♏ij to ♏v. In consequence of the tannin which it contains, cinnamon or its preparations are incompatible with those of iron.

PULVIS CRETÆ COMPOSITUS, *L.D.E.*

COMPOUND POWDER OF CHALK.

Take of Prepared chalk, half a pound.
Cinnamon, four ounces.
Tormentil,
Acacia, each, three ounces.
Long pepper, half an ounce.

Rub them separately to very fine powder; then mix them.

D. Chalk, ℥iv : Cinnamon, ℥iss : Gum Arabic, ʒvj : Nutmeg, ʒss. Mix.

E. Chalk, ℥iv : Cinnamon, ℥iss : Nutmeg, ℥j. Mix.

The flavour of these powders is so different, owing to the difference in the kind and proportion of the spices, that one of them cannot be substituted for another in dispensing: their medicinal properties are, however, the same.

Medicinal properties and uses.—Astringent and antacid. Used in diarrhœa. It is inadmissible if there is much heat or irritability of the mucous membrane of the bowels, in consequence of the spices which are present: but these increase its value if nausea, flatulence, and purging are the prominent symptoms.

Dose.—Gr. x to ʒj, generally made into a mixture with some demulcent fluid.

PULVIS CRETÆ COMPOSITUS CUM OPIO, *L. D. E.*

Compound Chalk Powder with Opium.

Synonyme. Pulvis Cretæ Opiatus, *D. E.*

Take of Compound chalk powder, six ounces and a half (℥vi, *E.*)
Opium, powdered, four scruples.
Mix them.

Medicinal properties. — *Astringent; anodyne.* The addition of the opium increases its astringency, and makes it slightly narcotic.

Dose. — Gr. x to ʒss, in some demulcent mixture.

Forty grains contain one grain of opium in the Ph. L. and Dub., and, as nearly as possible, the same proportion in the Ph. Ed.

PULVERES EFFERVESCENTES, *E.*

Effervescing Powders.

Take of Tartaric acid, one ounce.
Bicarbonate of soda, one ounce and fifty-four grains; or
Bicarbonate of potash, one ounce and one hundred and sixty grains.

Reduce the acid, and either bicarbonate, separately, to fine powder, and divide each into *sixteen* powders; preserve the acid and alkaline powders in separate papers of different colours.

PULVERES EFFERVESCENTES CITRATI, *D.*

Take of Crystals of citric acid, nine drachms.
Bicarbonate of soda, eleven drachms; or,
Bicarbonate of potash, thirteen drachms.

Powder, and divide as above (Pulv. efferv. *E.*) into eighteen powders.

PULVERES EFFERVESCENTES TARTARIZATI, *D.*

Take of Crystals of tartaric acid, ten drachms.
Bicarbonate of soda, eleven drachms; or,
Bicarbonate of potash, thirteen drachms.

Powder, and divide as above (Pulv. efferv. *E.*) into eighteen powders.

Remarks. — The above powders all agree in their medicinal properties. The carbonic acid set free during effervescence is grateful to the stomach, and sometimes relieves vomiting or nausea; the powders are *refrigerant*, and, if taken often enough, *laxative*. They are often given in fever.

Dose. — One powder of each kind, repeated several times daily.

PULVIS JALAPÆ COMPOSITUS, *L. D. E.*

COMPOUND JALAP POWDER.

Take of Jalap, three ounces.
Bitartrate of potash, six ounces.
Ginger, two drachms.
Rub them separately to powder; then mix them.

D. Jalap, ʒij; Bitart. of potash, ʒiijss; Ginger, ʒss.

E. Jalap, ℥j; Bitartrate of potash, ʒij. Mix.

Remarks. — Jalap and cream of tartar are both of them purgative, and the ginger is added to prevent griping. The Ph. Ed. does not order any ginger, and the powder has therefore a very different flavour from that of the Phs. L. or D., and is liable to cause griping.

Dose. — ℈j to ℈ij, repeated several times daily.

EXOGONIUM PURGA, formerly called Ipomæa Jalapa (Pentandria Monogynia; Convolvulaceæ).

Description. — *Jalap* is generally seen in pear-shaped masses about the size of an egg, which are frequently broken in halves or quarters, are hard, wrinkled, and dark brown externally, and have a lighter colour internally. They are not easily powdered, and their odour is slight whilst entire, but increases on being powdered. The taste is sweetish at first, but becomes acrid after being held in the mouth a short time. They are frequently worm-eaten, but this does not lessen their value, as the worms eat the starchy portion, and leave the resinous, which is the active part of the root.

Composition.—*Resin* and *starch.* The resin is insoluble in water, but is soluble in alcohol. It does not form an emulsion when triturated with water, but collects in clots. Scammony resin, which somewhat resembles it, does form an emulsion, by which it may be distinguished.

Medicinal properties. — *Hydragogue cathartic.*

Characteristic effects as a purgative. — Safe, producing copious watery stools. It is liable to cause nausea or vomiting soon after being taken. It operates quickly and is apt to gripe. It does not cause feverishness or vascular excitement, and is much less irritating to the mucous membrane than gamboge, which it strongly resembles in its hydragogue effects. It is not quite so active a purgative as scammony, and must be given in a larger dose. Its operation is said to be less frequently followed by constipation than that of most other purgatives. It readily produces salivation if frequently repeated.[*] I have never, however, known an instance of this.

Uses.—As a common purgative, in almost every disease requiring this class of remedies. It is especially useful for children, as they do not object to its sweet flavour. In *anasarca* and *dropsies* generally it is very frequently employed in combination with cream of tartar. In *affections* of the *head*, as a revulsive. It is highly useful as an anthelmintic, in children whose bowels are loaded with unhealthy mucus. In the early stage of a catarrh, a brisk calomel and jalap purgative is often very useful in relieving the congestion of the eyes, nose, and head.

Dose and administration.—Gr. x to gr. xx. Its purgative effects are increased by combination with a few grains of calomel. It cannot be better administered to children than by making it into gingerbread-nuts with treacle and flour, which they eat with pleasure; each nut may be made of such a size as to contain gr. iij or gr. iv. It is frequently taken in warm beer, which seems to promote its action. Camphor is said to lessen its griping tendency.

PULVIS IPECACUANHÆ COMPOSITUS, *L. D. E.*

COMPOUND POWDER OF IPECACUANHA.

Synonyme. Pulvis Hipponis compositus. Pulvis Doveri.

Take of Ipecacuanha, powdered,
Opium, powdered, each, a drachm.
Sulphate of potash, powdered, an ounce.
Mix them.

Remarks upon the compound powder of ipecacuanha.—The sulphate of potash is here employed in order to separate the particles of the ipecacuanha and of the opium; it probably does not impart any medicinal properties. In this combination the opium increases the diaphoretic powers of the ipecacuanha, and lessens its nauseating properties, whilst the narcotic effects of the opium are diminished by the ipecacuanha. This is the most certain and valuable diaphoretic contained in the Pharmacopœia; in order to obtain its full effect, it "ought not to be given until morning, as sleep appears unfavourable to its diaphoretic operation."* I have frequently observed that ten grains of the powder administered at night has failed to produce any diaphoresis. The patient must abstain from taking diluents or warm draughts soon after the powder, lest it should be rejected.

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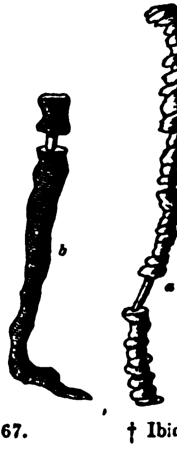
[*] Pereira, Mat. Med. (2nd edit.), p. 1274.

Uses.—In *acute rheumatism* it is often administered with the best effects. After the necessary depletion, it is to be given in a full dose. Craigie says that the quantity usually given is far too small; that it ought to be at least ℈j or ʒss; and he states that Dr. Dover himself was in the habit of prescribing ℈ij to ʒj or more.† In *acute and chronic dysentery*. The usual formula on board the Dreadnought, where this disease is very common, is three grains of Dover's powder and three of hydrargyrum cum creta, every four or six hours; and the effect is most satisfactory. Depletion is not always premised. In one or two instances salivation has been produced by these doses, and I have generally obtained more satisfactory results from half the above dose of the mercurial.

Dose.—Gr. ij to gr. v repeatedly in dysentery; gr. x to ʒss as a sudorific. Ten grains contain one grain of opium and one of ipecacuanha, and sometimes cause vomiting.

CEPHAELIS IPECACUANHA (Pentandria Monogynia; Cinchonaceæ).

Description.—*Ipecacuanha* root (Hippo; Radix anti-dysenterica) has a very characteristic appearance: it resembles a number of beads upon a white string; the colour, externally, is dirty brown, and it frequently happens that the bark of the root is detached at some part, as at *a*, and exposes the slender white meditullium. Sometimes there are no rings, as in *b*. Ipecacuanha is frequently called Hippo, by Dublin lecturers and authors.



Characters.—Grey; twisted; sometimes fissured, and encircled by deep grooves; of an acrid, aromatic, bitterish taste.

Composition.—Odorous *fatty matter* (inert) and *emetina*: this is not crystalline; it is inodorous; slightly bitter; white, when quite pure, but generally greyish-yellow; and appears to be the active principle of the root.

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* Craigie's Pract. Med. art. "Rheumatism," p. 567.

† Ibid.

General medicinal properties.—*Emetic; expectorant; diaphoretic.*

Characteristic properties.—The most remarkable property of ipecacuanha is the very violent effect which it produces upon some persons, even in the smallest quantities. It causes the most intense dyspnœa, resembling an attack of spasmodic asthma, with wheezing and oppression of the præcordia, sometimes accompanied with violent sneezing. The idiosyncrasy of habit which causes this effect is generally noticed the first time of the administration of this drug; but it would appear as if it was sometimes acquired at a late period of life, by a person who may not have previously possessed it. I am intimately acquainted with a lady in whom ipecacuanha produced merely its ordinary effects, until after the birth of her third child. She was on one occasion mixing some of the powder for one of the children, when she was seized with this violent spasmodic affection, and has, from that time, been so susceptible of its influence, that the mere withdrawal of the stopper from a bottle containing the powder brings on an attack, though she may not be aware of the presence of the drug. These effects usually remain for about two hours; the employment of powerful vegetable astringents is the best treatment at present known in these cases.

In small doses, if aided by external heat and diluents, ipecacuanha is an excellent diaphoretic; and it exerts a remarkable influence upon the mucous membrane of both the pulmonary and alimentary systems; it abates inflammations in this tissue, and restores the secretion to its natural state. In fuller doses it acts as a nauseant, and in still larger ones it operates as an emetic.

Characteristics as an emetic.—It does not act very quickly; it causes far less depression than tartar emetic; it does not produce so great an effect upon the kidneys as squill, and is also less acrid; its operation is generally followed by diaphoresis and sleep; and it is never poisonous, if given in an over-dose. When combined, in small doses, with purgatives, it prevents the increase of appetite which often succeeds the operation of this class of remedies, and considerably promotes the purgative effect. Some physicians find that a continued state of nausea can be maintained better by ipecacuanha than by tartrate of antimony, and with less risk of causing gastric irritation. Dr. M. Hall has remarked upon the peculiarity of its influence over the eighth pair of nerves (pneumogastric); for when its powder is inhaled into the lungs it causes a suffocating catarrh, or the affection above described; and, when taken into the stomach, it occasions vomiting. Its operation is remarkably beneficial in chronic affections of both the pulmonary and alimentary mucous membranes; it is thought by many persons to act almost as a tonic to the latter, improving the secretions and the appetite, and increasing the digestive power.

Uses.—In *bronchitis*, either acute or chronic. In the first, its nauseant properties are useful; in the second, it restores the secretion to its healthy condition and quantity. In *dysentery* it is very valuable when combined with opium and some mild mercurial; it is given in both the acute and chronic stages. On the *accession of fever*, especially in children, it is given as an emetic. Its operation is generally followed by sweating and sleep, and the attack of fever is often cut short. In the *cold stage of ague* it is also given as an emetic. In *acute rheumatism.* (See Pulvis Ipecac. co., *Remarks*, p. 671.) In *hæmorrhages*, especially pulmonary and uterine, in continued nauseating doses. Dr. Osborne has noticed much benefit in epistaxis, in emetic doses. In *hooping cough*, as an emetic. In *peritonitis* it has been advised, especially in that form which attacks puerperal women.* It has been given as an emetic even in the *advanced* stages of *phthysis;* but I have not observed any good follow its operation, and it adds greatly to the distress of the patient: in the *early* stage of this disease, Dr. Hughes has found it most beneficial. Dr. Craigie strongly advises small doses (gr. ss) to be combined with cathartics when given to *gouty* patients, to lessen the exuberant appetite which they generally enjoy. As it does not excite inflammatory action, it may be given as an emetic, if necessary, in inflammation of the stomach or bowels.

Antidotes.—Tincture of galls or some vegetable astringent, as green tea, is the proper antidote for an overdose.

Dose and administration.—As an *emetic* ℈j to ℥ss is usually given; but in weak and irritable habits, gr. ij to vi often accomplish this object, and in such cases it is advantageously combined with a few grains of carbonate of ammonia. Indeed, gr. j, in Dover's powder, not unfrequently nauseates, or even causes vomiting. Its effect is promoted and quickened by combination with tartrate of antimony (gr. ss or gr. j). As a *nauseant*, gr. j or gr. ij, every one or two hours aided by warm diluent draughts. As a *sudorific*, the same dose and accompaniments. Its nauseating and diaphoretic effects generally go together, but are not quite proportioned to one another. Its sudorific effects are very much increased by combination with opium, which also lessens its nauseating powers; and, on the other hand, the narcotic, but not the anodyne, powers of opium are diminished by the combination. As an *expectorant*, gr. ss to gr. j, combined with others of the same class, or with opium; and the same or double the dose may be given repeatedly in dysentery.

Remarks upon emetina.—It is given as an emetic in smaller doses than ipecacuanha, but causes longer continued nausea, though it operates more quickly.

Dr. Domeier mentions several cases, in which the common, slightly impure emetina acted favourably in doses of gr. ij.† It is only as an emetic that it is substituted for the powdered root.

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* Christison (quotation from Desormeaux).

† Med. Gaz. vol. xxiv. p. 929.

PULVIS KINO COMPOSITUS, *L.*

COMPOUND POWDER OF KINO.

Take of Kino, fifteen drachms.
Cinnamon, half an ounce.
Dried opium, a drachm.

Rub them separately to very fine powder; then mix them.

Medicinal properties and uses. — *Astringent* and *aromatic.* It has been found useful in *pyrosis*, but is chiefly used in simple *diarrhœa.*

Dose. — Gr. v to ℈j. Twenty grains contain one grain of opium.

PULVIS RHEI COMPOSITUS, *D. E.*

COMPOUND RHUBARB POWDER.

Synonyme. Gregory's Powder.

Take of Rhubarb, two ounces.
Magnesia, six ounces.
Ginger, one ounce.

Mix them.

Medicinal properties. — This powder, originally prescribed by Dr. Gregory of Edinburgh, and named after him, is a most valuable combination of useful remedies in *colic* and the first stage of *diarrhœa*, or in *dyspepsia* dependent upon acidity of the stomach or small intestines (primæ viæ). The magnesia corrects the acidity, which is the chief cause of the griping, and the ginger also acts as a carminative, whilst the rhubarb, by its first operation as a purgative, carries off the offensive contents of the bowels, and by its subsequent astringent effect checks the diarrhœa. A single dose frequently effects a perfect cure when taken at the commencement of an autumnal diarrhœa.

Dose. — ℈j to ʒss. The powder is extremely light and bulky, and requires a little care in mixing it with water.

PULVIS RHEI SALINUS (*Guy's Ph.*).

SALINE RHUBARB POWDER.

Take of Rhubarb, one drachm.
Sulphate of potash, powdered, two drachms.

Mix.

Medicinal properties and uses. — This powder is introduced, although not in any of the Pharmacopœias, in consequence of its value in the treatment of the febrile mesenteric affections of children characterised by a tumid belly, a thick furred tongue, and offensive motions, with frequent accessions of feverishness: in these cases a mercurial purgative should be first administered, and then this powder should be given in doses of gr. x to gr. x, two or three times a day, or ℈j every morning.

PULVIS SALINUS COMPOSITUS, *E.*

Take of Pure muriate of soda,
Sulphate of magnesia, of each, four ounces.
Sulphate of potash, three ounces.
Mix.

Medicinal properties and uses. — Purgative; producing watery stools.

Dose. — ʒss to ℥j.

PULVIS SCAMMONII COMPOSITUS *L. D. E.*

COMPOUND SCAMMONY POWDER.

Take of Scammony,
Hard extract of jalap, each, two ounces.
Ginger, half an ounce.
Rub them separately to very fine powder; then mix them.

D. Scammony, ℥j; Compound jalap powder, ʒiij.

E. Scammony and Bitartrate of potash, of each equal parts.

Medicinal properties and uses. — These powders differ so much from one another, that they cannot be used indiscriminately in prescribing or dispensing.

The London powder is simply cathartic, the combination of the two purgatives acting more efficiently than either of them alone, whilst the ginger is added to prevent the griping generally caused by jalap. The Dublin and Edinburgh powders contain cream of tartar, which acts as a diuretic as well as a purgative. The Ed. form, containing neither ginger nor jalap, cannot be in any way a substitute for that of London.

Dose. — Gr. x to gr. xx.

PULVIS TRAGACANTHÆ COMPOSITUS, *L. E.*

COMPOUND POWDER OF TRAGACANTH.

Take of Tragacanth, powdered,
Acacia, powdered,
Starch, each, an ounce and a half.
Sugar, three ounces.
Rub the starch and sugar together to powder; then, the tragacanth and acacia being added, mix them all.

TRAGACANTH, Astragalus Verus (Diadelphia Decandria; Leguminosæ.)

Description. — Tragacanth is a natural exudation from the stem of the tree, and only flows during the night. It is generally in large, broad, thin, white or yellowish pieces.

Composition. — *Tragacanthin* and *bassorin.* This last differs from gum in not being soluble in water, but it absorbs this fluid in large quantities, and swells up, forming a very thick tenacious mucilage. Tragacanthin is soluble in water.

Medicinal properties and uses. — *Demulcent; emollient.* It is chiefly used in the early stage of *gonorrhœa*, combined with nitre or liquor potassæ. It may be taken in cases of *irritable bladder*, or in *strangury* produced by cantharides. It is chiefly used as a vehicle for active or heavy medicines.

Dose. — Gr. xv to ʒj, repeatedly. It is only given as a mixture.

SAPONES.

SOAPS.

Composition. — Soaps are compounds formed by the action of caustic alkalies upon oils or fats. The chief constituents of oil or fat are *margarine*, *stearine*, and *oleine*. The two former are solid at ordinary temperatures, whilst the last is fluid. Each of these is a fatty salt composed of a sweet substance termed *glycerine*, combined with margaric, stearic, and oleic acids, respectively; forming margarate, &c. of glycerine.

Fat or tallow consists of *stearine* with a *small* quantity of *oleine.*

Olive oil consists of *margarine* and *much oleine.*

Almond oil differs from the last in containing a *smaller* proportion of *margarine.*

Palm oil consists of *oleine*, combined with about two-thirds of its weight of white solid fat called *palmitine*, which contains palmitic acid; there is also, perhaps, a small quantity of margarine.

Process of saponification. — When any of these compounds is boiled with a caustic alkali, the fatty salt is decomposed, and its glycerine is set free and is dissolved by the water, whilst the fatty acid combines with the alkali: the solution is then evaporated, and the soap is obtained in the solid form, and consists of stearate or margarate, and oleate of the alkalies. The glycerine is poured off with the excess of the alkaline lye. It is a remarkable property of the alkalies potash and soda, that the former yields a soft soap when boiled with an alkali, whilst the latter forms a hard soap.

When oils are mixed with caustic ammonia, a fluid soap is formed; and when oxide of lead (litharge) is heated with oil or fat, it takes the place of an alkali, and a stearate or margarate of lead is formed, which is sometimes called a lead soap, of which common lead plaster is an example.

Properties. — All the alkaline soaps are soluble in water and in alcohol. When a metallic or earthy salt is added to the solution, the fatty acid combines with the metallic or earthy base, and forms an insoluble soap; and the alkali combines with the acid set free. It is the presence of earthy salts which makes some waters "hard;" by which is meant that the soap becomes clotted and insoluble, as soon as it is placed in them; "soft" water either contains no saline ingredients, or these are alkaline and not earthy salts. Tincture of soap is used as a test for the presence of earthy salts in water.

Varieties. — Only two kinds of soap are used in medicine: hard and soft.

Sapo Durus, *hard*, *Castile*, or *Spanish soap*, is formed by boiling olive oil with caustic soda; it is sometimes white, but is generally mottled. The white soap is the purest, but it contains a much larger proportion of water, and is therefore the weakest. The mottled soap is not so pure, but is much stronger; the red streaks are communicated by the addition to the soap, before evaporation, of sulphate of iron; oxide of iron is precipitated, and combines with the soap; it soon passes into the red peroxide, and gives rise to the coloured streaks.

Sapo Mollis, *soft or sweet soap*, is directed to be made from olive oil and potash, but it is seldom or never made in this way, except for special purposes. Common soft soap is made from common fish oil (whale, seal, &c.), suet, and potash, and has a peculiar disagreeable odour, a yellow colour, and contains many small grains, which make it resemble the interior of a fig; these are grains of stearic soap, formed by the tallow.

Common soft soap, made from fish oil, suet, and potash, is on no account to be used instead of soap made of olive oil and potash.

Medicinal properties. — *Antacid; lithontriptic; purgative; detergent.* Soap is much less irritating to the stomach than the uncombined alkalies, and it may accordingly be administered where these would not agree, or would produce dangerous effects in the requisite quantity; the acid in the stomach combines with the alkali, and the fatty acid is set free; this is in time digested, but is liable to cause nausea and indigestion. In large doses, soap causes diuresis, and renders the urine alkaline, and also acts as a purgative; it increases the solubility of several medicines, and is therefore much used for making up pills.

Uses. — As an antacid in *poisoning by the mineral acids*. The quantity of alkali required to neutralise the acid would itself cause dangerous effects, if administered uncombined. In cases of *stone*, in which the urine is very acid, it is sometimes given with advantage. It forms a purgative ingredient in the colocynth enema. In the constipation of infants and young children, in whom it is generally desirable to avoid giving purgatives, a small cone of hard soap two or three inches in length, is frequently introduced as a *suppository*, half an inch or an inch, into the anus, and retained there until the bowels are moved; this generally soon happens, as the constipation is frequently the result of indolence in the child, and the irritation of the suppository quickly induces efforts to expel it, which at the same time empty the bowels. As a detergent, soft soap is frequently employed to cleanse and soften the scalp in *ring-worm* and some other cutaneous diseases: there are some skins in which the application of soap causes great irritation and increased formation of scurf. Hard soap is extensively used to give form, consistence, and solubility to pills, and was used almost exclusively for this purpose in the old Pharmacopœia. In the present one, however, soft soap is generally substituted, in order that the mass may be softer than was formerly the case; the pill-mass being, in many instances, so hard as scarcely to admit of division into pills. Soft soap enters into some ointments and liniments, and when spread as a plaster, is a popular application to promote the suppuration of boils.

Dose.—As an antidote to poisoning by the mineral acids, half a pint, or a pint of a saturated aqueous solution. For other purposes, the usual dose is from gr. v to ʒss.

ADEPS (AXUNGE, *E.*).

Lard.

Lard is the fat from the loins of the pig, which is melted and strained through a cloth, in order to separate the cellular membrane in which it is enveloped. It is soft at common temperatures, and melts at from 78° F. to 87° F. It should be nearly free from smell, but it soon acquires an unpleasant odour and acid properties if exposed to the air, or kept too warm; it is then said to be *rancid.* In order to prevent this change, salt is frequently added to the fresh lard; but this spoils it for medicinal use, and makes it irritating when applied to the skin.

Composition.—Fresh lard consists of

Stearine and margarine, 38 + elaine or oleine, 62 = 100.

It is owing to the large proportion of elaine that it is so soft, and liable to become rancid.

Uses.—It is chiefly employed in the formation of ointments, and is sometimes substituted for spermaceti ointment, in order to save expense; but it is liable to produce considerable irritation when applied to a blistered surface. The salt which is mixed with it may be removed to a considerable degree by washing in cold water; and this plan should always be adopted, if there is any reason to suspect that the lard is not fresh, and we wish to avoid causing irritation.

GLYCERINA, *D.*

Glycerine.

This substance is obtained from oil during the process of making soap, as is explained above. (See Sapones, *Process of saponification*, p. 677.) It may be conveniently obtained for medicinal uses by boiling olive oil with litharge (oxide of lead) and water; the lead combines with the stearic and margaric acids, and forms a lead soap, and the glycerine previously combined with these acids, remains fluid, dissolved in the water; sulphuretted hydrogen is then to be passed through the solution, which separates any small quantity of lead that may have been dissolved, and this being removed by filtration, the watery solution of glycerine is to be evaporated at a gentle heat, until it acquires a sp. gr. of 1·26 (*D.*), or 1·27. It is, however, generally made by evaporating the glycerine obtained from soap works, to a proper consistence.

Properties. — Glycerine, as thus obtained, is a slightly yellow, intensely sweet, scentless syrup, which is incapable of crystallising or becoming solid, is deliquescent, and is soluble in water and spirit.

Medicinal properties and uses. — Glycerine is a soothing application to surfaces abraded by scalds or other causes; to chapped lips and nipples; and to the skin, when irritable and inflamed from cutaneous eruptions, such as *psoriasis*, *eczema*, and *impetigo*, in which it produces great relief, as it is not liable to become dry and harsh; but, owing to its deliquescent property, remains moist and soft. It is, however, in the treatment of *deafness* from rigidity of the membrana tympani, or from a deficient secretion in the meatus externus, that this substance has been chiefly extolled, and many cases have been published in which it has produced great benefit when dropped into the ear and retained there by a little cotton. Several aurists have sneered at it, and said that it was no better than olive or castor oil, or even cold water, in similar cases. The reports, however, preponderate in its favour.

Dose and application.—When dropped into the ear, it should be used undiluted; but when applied to excoriated surfaces, it may be made up with rose water, or used alone, being smeared on like an ointment. It is never used internally.

AMYGDALÆ OLEUM, *L.*

ALMOND OIL.

Process. — Almond oil is obtained by submitting either sweet or bitter almonds to pressure; the latter are generally preferred, as they are cheaper, and yield more oil.

Composition. — *Margarine* and *oleine.* The quantity of margarine is small.

Medicinal properties. — *Demulcent; emollient;* and *laxative.*

Uses. — It may be used instead of olive oil in liniments, &c. It is sometimes employed, when mixed with confection of dog rose, in the form of linctus, to allay troublesome tickling cough. Mixed with an equal volume of syrup of violets or syrup of roses, it is an agreeable laxative for infants.

Dose. — As a *laxative for infants*, f℥ss or f℥j. In other cases, *ad libitum.*

MORRHUÆ OLEUM, *L. D.*

COD'S LIVER OIL.

Synonyme. Oleum Jecoris Aselli.

Description. — This oil is procured from the liver of the Gadus morrhua or Asellus major, the common cod-fish, and several allied species. It is obtained either by exposing the livers to the sun's heat until they begin to rot, and catching the oil as it runs out, or by heating them to a point short of boiling in an iron pot, and straining the oil from the tissue of the organ. As first obtained by either of these processes, the oil has a dark yellowish-brown colour, and an offensive odour and taste; but it is now purified with care, and is brought into the market almost free from colour, taste, or smell. It has still, however, a slight sickly flavour. It does not appear as if the medicinal properties were affected by the purification, as both the rank and the refined oils produce equally satisfactory results. The palate soon becomes accustomed to the flavour, and, though at first the oil frequently occasions nausea, and even vomiting, it is not uncommon for patients in a few days to prefer the coarser flavoured to the refined oil.

Adulterations.—The extensive demand for this oil at present has probably lead to adulteration; but up to the present day no satisfactory test has been discovered for ascertaining its purity. It is doubtful how far admixture with the oil from the livers of other fishes allied to the cod can be considered injurious, as we are not yet sufficiently acquainted with their medicinal effects to be certain that they may not correspond with those of the cod.

Composition.—The ordinary constituents of oils in general have been found in this oil, and a *small* quantity of iodine is always present, but little in its chemical constitution has yet been discovered which explains its characteristic medicinal effects. The other principal ingredients, as discovered by Dr. Jongh, are the following:—

Fellinic and cholic acids (constituents of bile), about	$\frac{1}{4}$	per cent.
Bilifulvin, bilifellinic acid - - -	$\frac{3}{4}$	„
Gaduin (a peculiar principle), amount not determined.		
Iodides (and a trace of bromides) - -	$\frac{1}{10}$	„
Phosphorus (free), a trace - - -	$\frac{1}{150}$	„

Winckler has discovered that glycyl ($C^6 H^6$), the ordinary basis of oils or fats, is replaced in cod-liver oil by propyl ($C^6 H^7$), and that when saponified by oxide of lead, *propylic acid* is obtained instead of glycerine. From whale-oil soap (also an animal product) he has obtained *propylamin* by distillation with quick lime and muriate of ammonia.*

It appears, therefore, that there is an essential difference between (at any rate these two) animal oils and vegetable ones, independent of the constituents of bile, which are present in cod-liver oil in the above-mentioned small proportions—a difference which may possibly be sufficient to account for the effects produced by the former class of bodies generally, and cod-liver oil especially.

Chemical properties.—The most prominent and characteristic property is the deep violet or brown tint which is produced when strong sulphuric acid is dropped into cod-liver oil. It appears almost certain that this effect is owing to the action of the acid upon the cholic acid and other constituents of the bile, and not to

* Ass. Med. Jour. Oct. 1853, p. 945.

the iodine which is contained in the oil; and it is sufficient to show that the oil has been obtained from the liver, but not that it is unadulterated with oil obtained from other sources.*

Medicinal properties.—Cod-liver oil, when first taken, often produces nausea and even vomiting, but in a few days both palate and stomach become accustomed to it, and it is retained with ease; in many cases, it even becomes positively grateful to the palate. It is established beyond doubt, that it has a remarkable effect in abating the cough and hectic symptoms in phthysis, diminishing the expectoration, and restoring the appetite and flesh; and, in many cases, it is certainly proved that an actual recovery from an attack of this disease has been effected.

In using this expression, it is meant that, one or more pulmonary tubercular abscesses having formed, and produced their usual symptoms of hectic, sweating, cough, expectoration, and wasting, with the physical signs of dulness, crepitation, garguillement, and pectoriloquy, all these symptoms have disappeared, and the patient has been restored to a state of good health; which has sometimes continued for years; and when the lungs have been examined at a subsequent period, after death, empty and cicatrised cavities have been found, leaving no reasonable doubt of their being the remains of abscesses which have healed. The patients are not secured against a return of the disease, which may cause new abscesses, from which they may die; but, from the first occurrence of tubercular abscesses, they appear indisputably to have recovered.

In other cases, in which, without the presence of tubercle, the strength has diminished, the appetite fallen off, and the flesh wasted away without any definable cause, the oil has produced a perfect restoration to health in the course of a few weeks, and the patient has become fat and vigorous.

Its good effects in chronic rheumatism have long been known, but, until very recently, have been chiefly obtained by the class of out-door hospital patients in this country, and by the fishermen and natives of Newfoundland and Shetland, &c., who have used it as a domestic remedy against this troublesome disorder. Sir Arnold Knight's prescription book for out-patients at the Sheffield Infirmary, shows how extensive was its reputation, above twenty years since, in that town, amongst that class of people.

The modus operandi of cod-liver oil has been discussed at considerable length by Dr. T. Thompson (on Pulmonary Consumption, 1854), whose conclusions I have here condensed.

"Phthisis and rheumatism, the two diseases most benefited by cod-liver oil, agree in the remarkable deficiency of blood corpuscles in the blood (p. 80.).

In health—Albumen	76	-	Corpuscles 130
Phthysis	100	- - -	- 78
Rheumatism	100	- - -	- 74

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* Pereira, in Pharm. Jour. 1848-49; a highly interesting and valuable paper.

"The blood is overcharged with albumen, and the albuminous exudation being deficient in fat, elementary molecules are not formed, so as to constitute nuclei capable of development into cells. The oil probably tends to obviate this defect by combining with the albuminous element of chyme, so as to form the healthy chyle granules which feed the blood" (p. 72.).

Influenced by these views, he tried the oil in some other diseases of an anæmial character with encouraging success, viz. Diabetes—(Albumen 105 —Corpuscles 80), and Neuralgia and Sciatica (p. 82.).

He experimented with all the common vegetable oils (olive, almond, &c.) as substitutes for cod-liver oil; but was "completely disappointed" (p. 88.), except in the case of cocoa-nut oil, which in several cases "arrested phthysis as decidedly as cod-liver oil, and was more economical and palatable" (p. 102.). He tried also neat's-foot oil and sperm oil, and quotes numerous authorities as to the efficacy of whale oil, oil from the ray, from the condor, from scorpions and vipers, from the tortoise and cow-heels, from which he arrives at the conclusion that "the other varieties of fish oil differ from that obtained from the liver in palatableness, rather than in any essential difference of virtue;" that "neat's-foot oil is less strictly similar, and is to be regarded not so much as an equivalent as a rival to cod-liver oil" (p. 99.), and that animal oils generally are not without virtues, though not equal to those of the cod's liver; and that whilst the efficacy of this oil is not enhanced by the addition of ox-gall, and, therefore, of the elements of bile (p. 89.), it is sometimes increased *for a time* by the addition of a minute quantity of phosphorus (p. 97.), and is generally decidedly augmented by the employment along with it of caustic alkalies (p. 72.).

That when hæmoptisis is *active*, the oil should be suspended for a time, and cupping substituted; but when it is *passive*, the oil should be continued (p. 75.). That cod-liver oil confines rather than relaxes the bowels (p. 78.).

Uses.—Since cod-liver oil has become the fashion, there is scarcely any incurable disease in which it has not been prescribed, or taken by the sufferers without a physician's prescription; but the diseases in which its utility is most fully established are, *phthysis*, in almost every stage; general *marasmus*, or simple loss of flesh; and *chronic rheumatism.* I have found it give more relief than stimulating embrocations, in some instances when rubbed upon rheumatic joints, but it has failed to produce equal benefit in other cases. In *general scrofulous debility* and *enlarged glands*, it is useful. It has been used in various *cutaneous diseases*, chiefly *scaly* ones, but hitherto without uniform advantage. It ought not to be given, if the digestive organs are much disordered or the secretions unhealthy, until these have been restored to a better state, as it is liable to increase the mischief by its early nauseating effect. When the stomach will not bear the oil, Dr. Turnbull has found that the administration of tar water for a few days, frequently rectifies the disturbed condition of the digestive organs, and enables the stomach to retain it afterwards. (See Tar Water, p. 239.)

Dose and administration.—In general, f℥j or f℥ij is as much as the stomach will bear at first; but, in the course of a few days, f℥ss to f℥j, twice or three times a day, is easily retained. Many patients prefer taking it unmixed, whilst others take it floating upon water, spirit and water, or milk. The general dose is f℥ss, three or four times a day, which must be persevered in for some weeks before its full benefit is produced.

It has been stated to me by a dispensing druggist of careful observing habits, that when patients, without medical advice, have taken cod-liver oil for months together, *without any intermission*, they become as dependent upon it as a dram drinker does upon his ordinary stimulant; and that although they improve essentially in flesh and general health for a time, they fall off afterwards with an accelerated degree of rapidity. He, therefore, strongly urged upon all his customers taking the oil on their own responsibility, that they should cease taking it for two or three weeks, after having used it for a couple of months, and then begin again, instead of taking it uninterruptedly. It is seldom that medical men order its employment for many months without intermission, and I have been completely unsuccessful in obtaining any confirmation of this statement on that account: but the observation is worth bearing in mind, as it may possibly be true. It would teach the importance of intermitting its use occasionally during a long course of it.

"I have seldom found any advantage from exceeding the dose of ℥ss three times a day" (*Dr. T. Thompson*, p. 71.).

OLIVÆ OLEUM.

Olive Oil.

OLEA EUROPÆA (Diandria Monogynia; Oleaceæ).

Process.—Olive oil is obtained by crushing the ripe fruit of the olive tree, when the oil either runs out or may be separated from the bruised mass by simple pressure. The sooner the fruit is crushed after being gathered, the purer is the oil; but if allowed to remain in heaps, until some degree of fermentation commences, the quantity yielded is larger, though it is not nearly so fine.

Composition.—*Margarine* and *oleine*. The proportion of margarine is greater than in almond oil.

Varieties.—Several. Florence oil is the best, and Spanish oil the worst.

Adulteration.—Olive oil is said to be sometimes adulterated with poppy oil, which may be detected by the action of chloride of lime. If pure oil is triturated with one-eighth of chloride of lime, the mixture soon begins to separate into two distinct layers, and if left at rest, they are entirely separated at the end of four or five hours. If, however, even one-eighth part of poppy oil is present, the separation scarcely commences under six hours, and is not completed under eighteen hours; with a still larger adulteration, the separation is still slower, and with equal parts, none at all can be perceived.*

By the same test, the admixture of poppy with almond oil may be detected.

Medicinal properties.—*Nutritious; demulcent; emollient* and *laxative*. It is liable to become rancid, if long kept.

Uses.—It is taken extensively on the Continent as an article of diet. In this country it is little used internally, except as salad oil, and as a sauce to salted fish. It is sometimes administered when made into an emulsion with yolk of egg, as an unirritating laxative, and as a demulcent in coughs and inflammation of the bowels or urinary organs; it enters into the composition of laxative enemata, and has been employed as an anthelmintic. It was, at one time, supposed to be an antidote against the injurious effects of arsenical vapour evolved in smelting copper; but is not much relied on at present. It enters into the composition of many liniments, plasters, and ointments.

Dose.—As a laxative or anthelmintic, f℥j to f℥ij.

RICINI OLEUM.

CASTOR OIL.

RICINUS COMMUNIS (Monœcia Monadelphia; Euphorbiaceæ).

Description.—Castor seeds are about the size of French kidney beans, which they strongly resemble; they differ, however, in having the *hilum* at one *end*, whilst in the *bean* it is in the *middle* of one *side*. The seed coat is elegantly mottled with brown and white streaks, which occasion a similarity in appearance to the "ticks" infesting dogs and sheep, from which it takes its name (*ricinus*, a tick). The *leaves* are deeply divided into five or six diverging lobes, resembling the hand and fingers; from which circumstance the plant takes one of its names, "palma Christi." The fruit is about the size of a large cherry; is green, and *covered with green spines*. The seeds consist of an external husk or testa, and an internal white nucleus.

Process for obtaining the oil.—The husks are first separated, and the seeds are then crushed and submitted to pressure, under which the oil runs out, mixed with mucilage and albumen; it is then put into vessels surrounded by water, heated to 212°. By this means, the mucilage and albumen are coagulated, and are separated by straining the oil through flannel bags. This is the method adopted in the East Indies; and the oil which is very pure is sold as "cold drawn castor oil." In the West Indies, the seeds are first heated, to make the oil more liquid and easily separable when they are crushed. It is purified by heating it in contact with water, which dissolves or coagulates all the impurities; and the oil is separated, as before, by filtration. American castor oil is very pure, and, Pereira says, is not so nauseous as East Indian, but is liable to become solid in cold weather.

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* Lipowitz, Chemist, vol. i. p. 253.

Composition.—*Ricinine*; *elaïodine*; and *margaritine*. The seeds contain also a small quantity of a volatile acrid principle.

Characters.—Castor oil is thick, transparent, pale yellow, having a nauseous taste, and a slightly nauseous odour. It is entirely soluble in alcohol; in which respect it is strikingly different from fixed oils generally. This is used as a test against adulteration with any other fixed oil, such as olive oil. If it is not entirely dissolved by its own weight of alcohol, there is some adulteration present. It is not likely to be adulterated, as its wholesale price is cheaper than that of any oil which could be conveniently used.

Medicinal properties.—*Purgative.* The seeds also are purgative, when eaten; but they sometimes produce violent gastro-enteric inflammation. Twenty seeds are reported to have caused death in a girl eighteen years old.[*] Several patients came under my care with violent vomiting and purging from having eaten these seeds; and one of them, a girl about eighteen years old, was in the last extremity of danger for two days, after having eaten, as far as I could learn from herself, "about half a dozen." She eventually recovered; but for days she had to be supported by nutrient clysters, the stomach instantly rejecting everything that was swallowed.

The *leaves* of the castor oil plant are employed in the Cape de Verd Islands, under the name of BOFAREIRA, to promote the secretion of milk when it is slow in appearing after delivery, and even in *women who have not suckled for years*, *nor even given birth to children*; and a number of cases are reported which seem to place this remarkable property beyond doubt. There are two varieties of leaves, one with light green leaf stalks, the other with *reddish ones*; and these last are carefully avoided as being violently irritant. A handful of the first variety (called *white* bofareira) is boiled in six or eight pints of water, and the breasts are fomented with the decoction thus obtained, and some of the boiled leaves are afterwards laid upon them and retained until all moisture has disappeared. This plan is repeated several times a day for three days, unless the milk appears. If there is none at the end of this time, the treatment is abandoned as inefficacious; well-developed breasts are most easily affected — small shrivelled ones are less under its influence; but in these cases the leaves frequently act as an *emmenagogue*, and sometimes even produce a leucorrhœal discharge.[†] Exposure to cold or wet feet must be carefully avoided. Dr. Taylor Smith tested the effects of castor leaves obtained from the Chelsea, Kew, and Regent's Park gardens, and found their influence upon the English constitution to correspond closely with Dr. M. Williams's report from the Cape de Verd Islands. In some cases the flow of milk was copious, in others the catamenia were profusely excited. "From the effects in the cases related, the bofareira promises to be of considerable value as a direct emmenagogue; at all events the cases in which I have tried it, show that the plant does not lose its efficacy in this climate." *

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[*] Med. Gaz. vol. xix. p. 944.

[†] Dr. M. Williams, Lancet, Sept. 1850, p. 294., q. by Braith, vol. xxii. p. 461.

Characteristic effects.— Very speedy in its operation, generally acting in from two to four hours; certain; unirritating, and therefore admissible in cases of intestinal inflammation. When used habitually, the dose may be gradually diminished rather than requiring an increase. In whatever way introduced into the system, it causes purging. Dr. Nimmo states that it purges, if rubbed upon the abdomen, after the use of a hot bath. This plan might be worth trying in a case accompanied with vomiting in which the use of a purgative was required. The oil may be frequently recognised in the evacuations.

Uses. — Castor oil is the favourite purgative with women both *before* and *immediately after delivery*. After *operations* on the *pelvic viscera*, as for the extraction of stone from the bladder. In *fever*, accompanied with gastro-enteric inflammation. In *inflammatory affections* of the *bowels*, or of the *urino-genital organs*. In *diseases* of the *rectum*, as piles. In stricture. In *habitual constipation*. For *infants*, to whom the nauseous taste is not always offensive.

Dose and administration. — Castor oil is usually taken floating on water, or in gin, or some aromatic compound. Compound tincture of lavender added to water, furnishes a good vehicle. If poured into boiled milk and stirred up, the flavour of the oil is scarcely perceptible.

Dose. — f℥ss to f℥j. For an infant, from ♏x to fʒj.

TIGLII OLEUM.

Croton Oil.

Synonyme. Oleum Crotonis.

CROTON TIGLIUM (Monœcia Monadelphia; Euphorbiaceæ).

Description. — Croton oil seeds are rather smaller than those of the castor plant, and have a uniform dirty-brown exterior, instead of being mottled. The albumen is yellowish and oily-looking.

Preparation. — The husk is first removed, and the seeds are then crushed, and about 50 per cent. of oil is obtained on submitting the bruised mass to pressure.

Composition. — A trace of *volatile oil*; *fixed oil*; *crotonic acid*; and albumen; with some unimportant constituents.

Characters. — Croton oil, when pure, has a pale yellow colour, and is tenacious and thick, resembling castor oil in this respect. It is sometimes red, from the seeds having become musty before the oil has been expressed. It is readily soluble in ether, but is not entirely soluble in alcohol, by which its adulteration with castor oil may be detected. "When agitated with its own volume of pure alcohol, and gently heated, it separates on standing, without having undergone any apparent diminution." (*E.*) If its volume is diminished when shaken with alcohol, the presence of castor oil is proved (*Christison*). On the other hand, Dr. Nimmo states that 45 per cent. is soluble in alcohol. These apparently contradictory statements are both true, and depend upon the proportion of alcohol employed. When I agitated 100 grains of croton oil with three ounces of rectified spirit, about 45 per cent. was dissolved in a few hours; when, on the other hand, it was agitated with merely its own weight of spirit, scarcely any was dissolved. I have observed, however, that from 3 to 5 per cent. was always dissolved immediately, even when I had reason to believe that the oil was pure, from its effects, and the source from which it was obtained.

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* Lond. Jour. of Med. Oct. 1850, p. 951, q. by Braith. vol. xx. p. 404.

Medicinal properties. — *Drastic cathartic*, and *irritant*. When rubbed upon the skin, croton oil soon causes a pustular eruption, and, if too long continued, a deep slough. When applied in this way, it sometimes induces purging; but this effect is not constant.

Characteristic effects. — Very violent. Sometimes acts very quickly, and its effects are soon over; produces copious watery stools; when swallowed, causes severe heat in the throat; nausea, and sometimes vomiting; much griping, and borborygmus. Its effects, though sometimes violent, *are not* followed by much depression (*Christison*), *are* followed by great depression (*Pereira*). It is uncertain in its operation. One or two drops generally purge severely; but sometimes six, eight, or ten drops may be given without producing this effect. The seeds possess the same properties as the oil, but are even more acrid. One seed, if eaten, purges violently. The pustules which it produces are smaller and more numerous than those caused by tartar-emetic.

Uses. — In *obstinate constipation;* either alone or combined with other cathartics. In *cases in which the patient is insensible*, and so cannot or will not swallow voluntarily, as in *concussion* of the *brain*, or *coma* from other causes, or mania, one or two drops may be placed upon the tongue, and they are generally swallowed with the saliva; but I have seen the mouth extensively ulcerated the following day in consequence of its administration in this manner. In *acute hydrocephalus* of *children*, or in *acute inflammation of the brain* in adults. Sometimes as a hydragogue in *dropsy*. As an external application, it is rubbed upon the skin, so as to keep up constant counter-irritation in the neighbourhood of parts affected with chronic inflammation; as *chronic bronchitis*, *chronic peritonitis*, *chronic diseases of the joints*, and *chronic gastritis;* in *pleurodynia* it sometimes gives relief in this way. It is recommended by a writer in Braithwaite's Retrospect, vol. ix. p. 248., to be inserted with a lancet, as in vaccination, into various parts of a *nævus*, in order to produce inflammation and death of the morbid structure: six punctures are the limit of safety, and it would be safer to employ a smaller number.

Dose and administration.—As has been mentioned above, croton oil may sometimes be dropped upon the tongue; but if the patient is conscious, this causes too much pain in the throat; it is best made into pills with any dry substance, which are to be *well covered* with starch or liquorice powder. Ten or fifteen drops of the oil added to half an ounce of tartar-emetic ointment causes a milder and more speedy effect; the pustules are more numerous, and not so large or painful, whilst the result is equally good.

Dose.—Generally, ♏ss to ♏ij; sometimes as much as ♏iij to ♏x are required. I have known ♏xii given before purging was produced, though a single drop of the same oil purged another patient.

Officinal preparations.—Linimentum Crotonis.

SEVUM.

(Mutton) Suet.

Description.—Mutton suet is the fat surrounding the kidneys of the sheep. It is prepared by melting and straining it through flannel or linen.

Composition.—*Stearine* and *oleine*, and a *small* quantity of *margarine* and *hircin*.

Properties.—*Nutritive*, but difficult of digestion; *demulcent*; and *emollient*.

Uses.—It is preferred to hog's lard, in the formation of some ointments, in consequence of its greater firmness, and its smaller liability to become rancid.

SPIRITUS.

SPIRITS.

This term was formerly confined to those preparations in which spirit was distilled from some medicinal substance; but in the present Pharmacopœia it is applied to those preparations also in which some distilled product, such as a volatile oil, is dissolved in spirit without any subsequent distillation. Most of the spirits of the old Pharmacopœia are retained by name in the new one, but instead of being made from the herb or fruit, as formerly, are now almost exclusively prepared by simply dissolving the distilled oil in spirit.

Tinctures differ from spirits in not being distilled.

ALCOHOL, *D. E.*

This is now expunged from the London Ph. as it is never used medicinally. The following directions are given in both the Phs. Dub. and Ed.

Take of Rectified spirit, one pint.
Fresh burnt lime (powdered), eighteen ounces.

Expose the spirit and lime together to a gentle heat in a glass matrass till the lime begins to slake; withdraw the heat till the slakening is finished, preserving the upper part of the matrass cool with damp cloths; then distil seventeen ounces into a proper refrigeratory by a gently increasing heat. Sp. gr. not above ·795, *D.*; ·796, *E.*: if the density is greater than this, the distillation has been commenced before the lime has been thoroughly slaked.

Description and properties.—Alcohol is a transparent fluid, having a burning taste, and a peculiar, not disagreeable odour. It is very volatile, and its evaporation causes great cold. When mixed with water, the volume of the mixture is less than that previously occupied by the two fluids, and considerable heat is evolved. When quite free from water, its sp. gr. is ·796 at 60° F. When its density is ·820, it boils at 176° F.; and it has never been frozen by any known degree of cold.

Rectified spirit of sp. gr. ·838 contains 16 per cent. of water; and the object of the present process is to remove this, and obtain anhydrous alcohol. Freshly burnt lime has a very strong affinity for water, and when added to rectified spirit it combines with the water, and the pure alcohol is obtained by distillation.

There are other ways of removing the water from rectified spirit. If it is put into a bladder, and suspended in the air, the water passes in the state of vapour through the membrane, whilst the alcohol is retained. In this way the old spirit in preparation jars is much stronger than it was when first introduced, and the loss is not so great as is sometimes imagined. Freshly burnt carbonate of potash has a powerful affinity for water, and may be substituted for the lime. If rectified spirit is placed under the exhausted receiver of an air-pump which contains also some quicklime, it speedily loses all its water; both the alcohol and the water rise in vapour at first and fill the receiver; the lime absorbs the aqueous vapour, and the water continues to evaporate rapidly; but the alcoholic vapour present in the receiver, not being absorbed by the lime prevents any further evaporation of the spirit. The first of these plans was proposed by Sömmering, the anatomist, from observing the increased strength of spirit in old preparations; and the last was proposed by Graham.

Composition and preparation. — Pure alcohol consists of

3 eqs. hydrogen; 2 eqs. carbon; 1 eq. oxygen, $=H^3C^2O$; eq. 23.

Some chemists consider its eq. to be double this: $H^6C^4O^2$; eq. 46; and it is more convenient to use this number, when speaking of the theories of etherification; but both numbers express the proportions alike, and it is chiefly on hypothetical grounds that the double eq. is assumed to be the true one.

Alcohol is derived from sugar by fermentation; and the changes which occur may be thus described: — When sugar is dissolved in water, and yest is added to the solution, it becomes much agitated; carbonic acid gas is given off; the sugar disappears; and alcohol remains behind, combined with the water of the solution.

	C.	H.	O.
1 eq. sugar, consists of	6	6	6
2 eqs. alcohol	4	6	2
2 eqs. carbonic acid gas	2	0	4

Thus the sugar is entirely converted into alcohol and carbonic acid gas.

English spirit is obtained from barley; which is first converted into malt, by allowing it to germinate. Barley contains starch, but does not naturally contain much sugar; but during germination, a peculiar principle is developed, termed "diastase," which possesses the remarkable property of converting starch into sugar. The sugar thus obtained is fermented, and the spirit distilled from it. All spirit thus obtained contains a quantity of volatile oil termed "grain oil," or "fusel oil," derived from the barley, which communicates a disagreeable flavour to the spirit; and causes it to become milky on the addition of water. This oil is gradually separated, in rectifying the spirit; and it is on this account that the Colleges direct their proof spirit to be made by diluting rectified spirit with water, instead of using the common proof spirit of trade, which is always strongly flavoured with the oil. Spirit distilled from wine is free from this impurity, and it is owing to this circumstance that French spirits and liqueurs are so superior in flavour to our own.

Chemical properties.— Spirit combines readily with water in every proportion. It dissolves the active principles of many animal and vegetable substances, and is used officinally for this purpose. It also prevents the decomposition of organic bodies, with which it is in contact; and is therefore employed in putting up anatomical preparations, and is often added to mixtures or vegetable preparations in order to "keep" them. Whilst evaporating, it produces much cold, and is therefore used to reduce the temperature of an inflamed part; and from having never yet been frozen, it is employed in making thermometers for measuring very low temperatures.

Medicinal properties. — Alcohol is the basis of all spirituous and vinous liquors, which all agree in producing certain general effects, though there are many differences amongst them, which will be noticed hereafter.

Alcohol excites the system generally; quickens the circulation; increases the heat of the body; promotes the nervous energy, and gives brilliancy and rapidity to thought and expression. It causes thirst, increased secretion of urine, and at length sleep. If its use is long continued, it induces various diseases and minor bad consequences: the red nose of the habitual drinker is well known; and it very frequently produces congestion and enlargement of the liver; this is followed by contraction, which gives rise to the appearance known as "hobnail liver," and is a frequent cause of dropsy. Habitual dyspepsia, and depression of spirits and strength, with loss of mental energy except when under the influence of its excitement, are also daily consequences of habitual indulgence. To this list may be added gout, though this results from wine rather than from spirit drinking. When an habitual drinker, even if not a drunkard, is deprived of his accustomed stimulus, his nervous system becomes extremely irritable and feeble, and he is attacked with delirium tremens.

If taken in excessive quantity at one time, intoxication is produced. It is important to distinguish this state from some others, much more serious, for which it may be mistaken.

Diagnosis between drunkenness, poisoning by opium, apoplexy, and *simple concussion of the brain.* (See TINCTURA OPII.)

Peculiarities of the effects of different common spirits.

Brandy quickly causes intoxication of a heavy character, from which the person does not recover for many hours. It frequently leaves headache and disordered digestion, with loss of appetite for some days. If not taken so as to cause intoxication, it suppresses the secretions generally, occasioning constipation, scanty urine, loaded tongue, and thirst. Its habitual use is more liable than that of any other spirit to cause delirium tremens, and there is no other spirit which produces such permanently bad effects upon the system.

Rum readily causes intoxication, the effects of which are nearly as permanent as those of brandy. It does not check the secretions nearly so much as that spirit; and sailors have the opinion that it is somewhat expectorant, — that "it clears the chest and improves the wind." A debauch of two or three days upon this spirit is frequently followed by an attack of the "horrors," which is a modification of delirium tremens, that seldom lasts more than thirty-six or forty-eight hours, during which time attempts at suicide, by jumping overboard to escape from the pursuing fiend, are very common.

Whiskey produces a more lively form of intoxication than the last two, and it does not continue so long, and is very seldom followed by headache or disordered digestion. It used to be the boast of the Irish, that "there was not a headache in a hogshead of whiskey." It rather promotes than checks the secretions, especially that of the kidneys. It was very remarkable, that not a single case of delirium tremens fell under the notice of Sir H. Marsh, Dr. Graves, or Dr. Stokes, amongst the Irish, at the time when nearly the whole nation suddenly became tee-totalers.*

Gin; Hollands. This contains oil of juniper, which makes it diuretic: and the temporary effects from its use are slighter than those from any of the previously described spirits. It is said to check the growth if taken in childhood; and that it is given with this intention to pug dogs whilst puppies, to keep them small. It is very commonly used to relieve the pain of menstruation. A white (gin-drinker's) liver is the usual consequence of its habitual employment.

Uses. — Alcohol in its officinal forms is employed for making spirits and tinctures, and in the preparation of the vegetable alkaloids and of some extracts. The different kinds of spirit are in common use at the table, and are often prescribed medicinally even in hospitals, in consequence of a patient's health suffering, when deprived of a stimulus to which he may have been accustomed. It is important to know to what particular kind they have been habituated, as it generally produces more favourable effects than one to which they are not used. In extreme exhaustion, in fever, and some other cases, the mistura vini Gallici, or egg flip, may be given. The use of gin in dysmenorrhœa has been mentioned. Burnt brandy is a popular remedy for diarrhœa. Spirit of wine is often used externally in the form of evaporating lotions; and sometimes is applied alone to bruises and sprains, with very good effects. It is not long since brandy and salt were said to cure nearly every known disease; and they were often beneficially employed as a stimulating liniment in chronic rheumatism, and as an evaporating lotion in some tumours of the breast.

For obtaining a *vapour-bath*, burning spirit is highly convenient. The patient, when undressed, should sit upon a chair with a wooden bottom and have one or two blankets folded round him, so as to be close about the neck and to come down to the ground all round; the chair-seat should not be an open cane one. One or two ounces of spirit should be put into a cup upon the ground under the chair, and then set on fire; it burns slowly and produces so much heat as to cause copious perspiration, which may be prolonged, if necessary, by burning an additional quantity of spirit. Cold water may be drunk during the application of the heat.

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* Communicated to me by Dr. Stokes, in conversation, whilst acting as his clinical clerk.

Antidotes.—This of course means the treatment of drunkenness. If vomiting has not occurred it should be excited by an emetic of sulphate of zinc, or by tickling the throat with a feather. If necessary, the stomach-pump should be used. The head should be carefully raised high above the chest, when the patient is laid in bed, in order that he may run no risk of suffocation if he should vomit during his insensibility. It is occasionally necessary to excite the person to consciousness, in order to avert impending death, which has sometimes occurred during the drunken fit; this may generally be accomplished, by flagellation, or by the use of the galvanic battery. The wires being inserted in two sponges soaked in salt and water, one sponge may be applied to the side of the neck above the clavicle, and the other to the pit of the stomach.

SPIRITUS PYROACETICUS.

PYROACETIC SPIRIT. (Not Off.)

Synonymes. Acetone. Naphtha? *Symb.* C^3H^3O.

General remarks. — Under the general name of Naphtha or Medicinal Naphtha, a number of substances have been employed in medicine without any very exact or careful discrimination between them, and pyroacetic spirit or acetone is one of them. It is probable that this want of exactness is really of little consequence, for they all consist of carbon and hydrogen in large quantities and oxygen in small ones: they are all obtained, directly or indirectly, by the destructive distillation of wood; they all possess a general odour of tar, and are highly inflammable; and experience proves that the results obtained from one are scarcely distinguishable from those obtained from the others. Pyroacetic spirit was one of the first of these pyrogenous compounds which was employed, and although not officinal it is introduced in this place because it is still employed in medicine with benefit.

Mode of obtaining it. — Pyroacetic spirit or acetone is obtained by passing acetic acid through a tube heated to low redness, or by exposing the acetate of an alkali or alkaline earth to a similar temperature. It is however best prepared by distilling a mixture of two parts of acetate of lead and one part of quicklime at a low red heat. During this process

1 eq. acetic acid $C^4\ H^3\ O^3$ is converted into
1 eq. acetone $C^3\ H^3\ O$
1 eq. carbonic acid $C\ \ O^2$

$C^4\ H^3\ O^3$

beside a little water, and two oily bodies. This impure mixture is then redistilled from chloride of calcium, and the product is afterwards poured upon fresh chloride of calcium and left for several days. It is then poured off, and three fourths are distilled.[*]

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[*] Brande's Manual, 6th ed. p. 1732.

Properties. — Acetone when pure is a colourless limpid fluid, very inflammable, and having a penetrating and peculiar odour — to many persons not disagreeable. Its sp. gr. is ·792. It mixes readily with water, alcohol, and ether, and may therefore be easily combined with tinctures to make an ordinary mixture.

Medicinal properties. — Pyroacetic spirit acts chiefly upon the bronchial mucous membrane, but its odour may be detected in the urine, showing that part of it at any rate passes off by the kidneys unchanged. It abates excessive bronchial secretion and produces a more healthy form of discharge. It frequently checks the *profuse sweating* and *exhaustion* of *phthysis*, and abates the cough both in this disease and in *chronic bronchitis*. Its merits were at one time lauded beyond its deserts, and it consequently afterwards fell into more discredit than it deserved. Both it and pyroxylic spirit (to be noticed hereafter) deserve employment; and if not used indiscriminately, and as specifics in every case of pulmonary affection, they will maintain a good reputation in the estimation of the practical physician. I have scarcely ever — I may almost say, I have never — known them produce vomiting.

Dose. — ♏xv to ♏xl. It is seldom that I find it necessary to exceed the dose of ♏xx or ♏xxx.

SPIRITUS PYROXILICUS, *D.*

Pyroxilic Spirit. Hydrated Oxide of Methyle.

Symb. C^2H^3+O+HO.

This is one of the products of the destructive distillation of wood, which yields about one per cent. of a highly inflammable volatile liquid, to which the above name has been applied. It is sometimes also called naphtha. It is purified from a great variety of compounds which are formed along with it during the distillation of the wood, by saturating it with dry chloride of calcium with which it combines; on the addition of water, the spirit is separated and is distilled; it is not, however, quite pure, but is purified by distilling it again from quicklime.

Properties.—It is a highly inflammable, colourless liquid. Sp. gr. (·800 to) ·846, *D.* It is not changed by exposure to the air and light. The odour is at first highly disagreeable, and the flavour somewhat resembles that of creasote. After a short time it ceases to be unpalatable to many persons.

Medicinal properties. — Pyroxilic spirit exerts considerable influence over the bronchial mucous membranes, not only diminishing the secretion when this is too great, as in the chronic bronchitis of old people, but promoting the expectoration of what is still secreted. It certainly is a valuable addition to cough mixtures for old people, and its offensive flavour is an advantage, rather than the reverse, in those cases of habitual cough mixture takers, which are met with at every dispensary and hospital.

Uses. — *Chronic bronchitis* in old people, and also in young ones, in whom a stimulant is not objectionable.

Dose. — ♏v to ♏xxx.

SPIRITUS RECTIFICATUS, *L. D. E.*

RECTIFIED SPIRIT.

Synonyme. Alcohol *Dilutum*, *L.*

Its sp. gr. is ·838, *L. E.*; ·840, *D.* It is colourless, and does not become opaque on the addition of water, nor is it tinged of a red colour on the addition of sulphuric acid. This spirit may be reduced to the strength of proof spirit, by adding three pints of distilled water to every five pints at 62°.

Ed. — Four fluid ounces treated with ♏xxv of solution of nitrate of silver, exposed to bright light for twenty-four hours, and then passed through a filter purified by weak nitric acid, so as to separate the black powder which forms, undergo no further change when again exposed to light with more of the test.

This is intended to prove the absence of "grain oil."

Composition. — Alcohol, 82; water, 18.

The sp. gr. is the best test of the strength of the spirit. If not rectified with sufficient care, a small portion of "grain oil" (see ALCOHOL, p. 691.) is present in the spirit, and renders it milky when mixed with water, and is reddened by sulphuric acid.

SPIRITUS FORTIOR, *D.*

STRONGER SPIRIT.

Take of Rectified spirit, half a gallon.
Pearlash (freshly burnt), eight ounces.

The spirit and pearlash are to be shaken together for four hours, and the liquid then separates, on being left at rest, into two layers; the lighter of which is to be decanted off, and distilled till seventy-two ounces have passed over. Sp. gr. ·818.

Composition. — Alcohol, 90; water, 10.

SPIRITUS TENUIOR, *L. D. E.*

PROOF SPIRIT.

Synonyme. Alcohol *still more diluted*, *L.*

L. — Take of Rectified spirit, Ov; Distilled water, Oiii.
D. — Rectified spirit, Ovii; Distilled water, Oiv.
E. — Rectified spirit, Oii; Water, Oi.

Sp. gr. ·920, *L. D.*; ·912, *E.*

Composition.—Alcohol, 49, water, 51.

Proof spirit is directed in the Pharmacopœia to be made by diluting five pints of rectified spirit, with three of distilled water. Its sp. gr. is ·920, which is that prescribed by the Excise as the standard for proof spirit. It contains 51 per cent. of water, and consists therefore very nearly of equal weights of water and absolute alcohol. The terms "twenty over proof," or "five under proof" are those employed by the Excise, and refer to the quantity of water, or of spirit, at ·825, which would be required to bring the spirit to the proof standard. Thus, "twenty over proof" means that twenty volumes of water must be added to every hundred of the spirit "to make it proof;" "ten under proof," means that ten measures of spirit at ·825 must be added to every hundred measures of the sample to raise it to proof.

SPIRITUS AMMONIÆ, *E.*

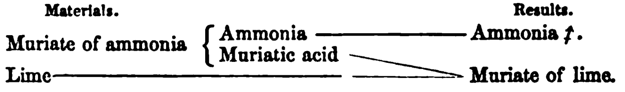
Spirit of Ammonia.

This preparation, which was formerly in the Ph. L., is now omitted: the following directions are from the Ph. Ed.

Take of Rectified spirit, two pints.
Fresh-burnt lime, twelve ounces.
Muriate of ammonia, in very fine powder, eight ounces.
Water, six fluid ounces and a half.

Let the lime be slaked with the water, and let the vessel be covered till the powder is cold; mix it quickly and thoroughly with the muriate of ammonia in a mortar, and transfer the mixture at once into a glass retort; adapt to the retort a tube which passes nearly to the bottom of a bottle containing the rectified spirit; heat the retort in a sand-bath gradually, as long as any thing passes over, preserving the bottle cool. The bottle should be large enough to contain one half more than the spirit used.

Process.—In this case, the lime decomposes the muriate of ammonia, and combines with the muriatic acid, whilst the ammonia is driven off as gas, and is dissolved by the spirit.



Properties.—This is more pungent than the old spirit of ammonia of the Ph. L., as it is a solution of pure ammonia, whilst the former one was a solution of carbonate of ammonia.

Uses.—It is only used for making the Spt. Am. Arom. and Spt. Am. Fœtid. of the Ph. Ed.

SPIRITUS AMMONIÆ AROMATICUS, *L. D. E.*

AROMATIC SPIRIT OF AMMONIA.

Synonyme. Spirit of Sal Volatile.

Take of Hydrochlorate of ammonia, six ounces.
Carbonate of potash, ten ounces.
Cinnamon, bruised,
Cloves, bruised, each two drachms and a half.
Lemon peel, five ounces.
Rectified spirit,
Water, each, four pints.
Mix them, and let six pints distil. Sp. gr. ·918.

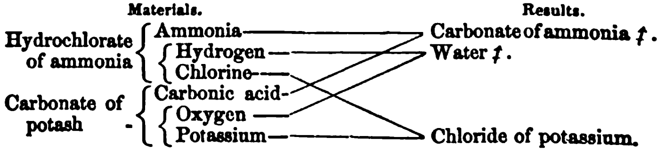
D. Rectified spirit, Oiij; Stronger *solution* of ammonia, f℥vi; Oil of lemon, f℥ss; Oil of nutmeg, fʒij; Oil of cinnamon, fʒss. Dissolve the oils in the spirit, and add the solution of ammonia; mix with agitation, and filter. Sp. gr. ·852.

E. *Spirit* of ammonia, f℥viii; Oil of lemon peel, fʒj; Oil of rosemary, fʒjss. Dissolve the oils in the spirit by agitation.

Remarks. — The quantity of the materials now ordered for making the ammoniacal ingredient in this spirit is one fourth greater than it was in the last Pharmacopœia.

All the Colleges differ in the aromatic ingredients with which they flavour this preparation; and the taste of a mixture dispensed from the same prescription here or in Scotland or Ireland, will therefore vary. The Dublin and Edinburgh spirits are also more pungent than the London one, in consequence of pure ammonia being employed in them, whilst the carbonate is present in that of London.

Process. — When hydrochlorate of ammonia and carbonate of potash are heated together, both are decomposed; the carbonic acid of the carbonate combines with the ammonia and forms carbonate of ammonia, which is distilled; the chlorine of the hydrochloric acid combines with the potassium of the potash and forms chloride of potassium, which remains in the retort; and the hydrogen of the acid and oxygen of the potash combine and form water.



Medicinal properties and uses. — This preparation resembles the last, but is rendered more agreeable by the aromatics. It becomes milky on the addition of water. It is a useful and favourite *stimulant* and *antispasmodic* in *hysteria* and *in common faintings.*

Dose.—♏xxx to fʒj.

SPIRITUS AMMONIÆ FŒTIDUS, *L. D. E.*

Fœtid Spirit of Ammonia.

Take of Hydrochlorate of ammonia, ten ounces.
Carbonate of potash, sixteen ounces.
Rectified spirit,
Water, each, three pints.
Assafœtida, five ounces.

Mix them; then with a slow fire let three pints distil. Sp. gr. ·861.

D. Assafœtida, ℥jss; Rectified spirit, Ojss; Stronger solution of ammonia, f℥iij. Break the assafœtida into small pieces, and macerate it in the spirit for twenty-four hours; then distil off the entire of the spirit, and mix the product with the solution of ammonia. Sp. gr. ·849.

E. Spirit of ammonia, f℥xss; Assafœtida, ℥ss. Break the assafœtida into small fragments, digest it in the spirit for twelve hours, and distil over f℥xss by means of a vapour-bath heat.

The remarks as to the difference between the different Colleges and the process of making this spirit which were made upon the Sp. Am Arom., apply to this preparation also.

Medicinal properties and uses. — *Stimulant* and *antispasmodic.* It is chiefly used in flatulent colic and in *hysteria*, to relieve the pain. In this singular disease its offensive taste is not a serious objection, but is rather an advantage. It is a convenient form for the administration of assafœtida as an enema.

Dose.—fʒss to fʒj. For an enema fʒii.

SPIRITUS ANISI, *L.*

Spirit of Anise.

Take of Oil of anise, three fluid drachms.
Proof spirit, a gallon.
Dissolve it.

Medicinal properties and uses. — *Stimulant* and *carminative* in flatulent colic, &c.

Dose.—fʒss to ʒij.

SPIRITUS ARMORACIÆ COMPOSITUS, *L.*

Compound Spirit of Horseradish.

Take of Horseradish, sliced,
Orange peel, dried, each, twenty ounces.
Nutmegs, bruised, five drachms.
Proof spirit, a gallon.
Water, two pints.
Mix them; then with a slow fire, let a gallon distil.

Medicinal uses.—*Stimulant.* It was formerly much esteemed as an antiscorbutic, but is now little used, except in dropsies accompanied with great depression.

Dose.—fʒss to fʒij.

Officinal preparation.—Infusum Armoraciæ compositum.

SPIRITUS CAMPHORÆ, *L.*

Spirit of Camphor.

Synonyme. Tinctura Camphoræ, *Ph. L.* 1836.

Take of Camphor, five ounces.
Rectified spirit, two pints.
Dissolve it.

Properties and uses.—*Stimulant.* Used chiefly as an external application to bruises and sprains, in which, if immediately applied for twenty minutes or half an hour, it produces considerable cold, removes the pain, and generally prevents discolouration or swelling.

It is sometimes a desideratum to mix this solution with water; but as soon as this is done, the camphor is separated. If, however, one part is previously mixed with four or five parts of rectified spirit, it is readily dissolved by water in such proportion that two drachms of the camphorated spirit are soluble in eight ounces of water, and the camphor does not separate, though the solution is not perfectly clear. In this form it is sometimes used as a gargle in quinsy, &c.

SPIRITUS CARUI, *L.E.*

Spirit of Caraway.

Take of Oil of caraway, two fluid drachms.
Proof spirit, a gallon.
Dissolve the oil.

E. Caraway, bruised, ℔ss; Proof spirit, Ovii. Macerate for two days in a covered vessel; add a pint and a half of water, and distil off seven pints.

Medicinal properties.—Carminative; stimulant.

Dose.—fʒss to fʒij.

SPIRITUS CASSIÆ, *E.*

Spirit of Cassia.

Take of Cassia, in coarse powder, one pound.
Proceed as for the Spirit of Caraway.

Properties.—Stomachic; stimulant. Not so fine flavoured as spirit of cinnamon.

Dose.—♏xx to fʒj.

SPIRITUS CINNAMOMI, *L. E.*

Spirit of Cinnamon.

Take of Oil of cinnamon, two drachms.
Proof spirit, a gallon.
Dissolve the oil.

E. Take of cinnamon, in coarse powder, ℔j. Proceed as for Spirit of Caraway.

Medicinal properties.—Stomachic and stimulant.

Dose.—♏xx to fʒj.

SPIRITUS JUNIPERI COMPOSITUS, *L. D. E.*

Compound Spirit of Juniper.

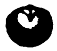
Take of Oil of juniper, one fluid drachm and a half.
Oil of caraway,
Oil of fennel, each, twelve minims.
Proof spirit, a gallon.
Dissolve the oils.

D. Juniper berries, bruised, ℥viii; Caraway seed, Fennel seed, of each, ℥j; Proof spirit, Oiv; Water, Oj. Macerate the berries and the seeds in the spirit for twenty-four hours, then add the water and distil off four pints.

E. Juniper berries, ℔j; Caraway seed, Fennel seed, of each, ℥jss; Proof spirit, Ovij; Water, Oij. Macerate the fruits in the spirit for two days, add the water, and distil off seven pints.

JUNIPERUS COMMUNIS (Diœcia; Monadelphia Coniferæ).

Description.—Juniper berries (fruit or cones) are small, round, and of a purple or blackish-blue colour. The end opposite the attachment of the stalk is marked by three curved lines meeting in the centre, which indicate the three divisions of which the fruit consists.



Fruits for which they may be mistaken.—The *berries* of *rhamnus catharticus; bay berries; black pepper; small unripe oranges.* They are *distinguished* from all these by the *triradiate spot* at their *summit*, by their *stickiness* when broken with the nail, and by their *terebinthinate odour and taste.*

Composition. — *Volatile oil; resin; wax;* and some *salts of potash and lime.*

Medicinal properties. — *Diuretic* and *stimulant* to the urinary organs, and in excesss, producing bloody urine. Their efficacy depends upon the volatile oil. The tops and wood do not differ essentially in composition or properties from the fruit.

Uses. — *Dropsies;* generally combined with other diuretics. Good genuine Hollands contains some of the volatile oil of juniper, but the common gin of the shops often consists chiefly of diluted oil of turpentine. The smoke of burnt juniper wood communicates the peculiar flavour characteristic of genuine German sausages.

Doses.—Of the fruit, ʒj or ʒij, triturated with sugar. It is more conveniently used in the form of infusion (℥j in Oj); dose, f℥ij to f℥iv, twice or thrice daily. Of the compound spirit, fʒj to fʒiv, combined with other diuretics. Of the oil, ♏ij to ♏vi.

SPIRITUS LAVANDULÆ, *E.*

SPIRIT OF LAVENDER.

Take of Lavender, fresh, two pounds and a half.
Rectified spirit, a gallon.

Mix them; then, with the heat of a vapour-bath, distil seven pints.

Remarks.—This is stimulant, and has an agreeable odour. It is not often used alone.

Officinal preparation.— Spiritus Lavandulæ compositus, *E.*

SPIRITUS LAVANDULÆ COMPOSITUS, *E.*

COMPOUND SPIRIT OF LAVENDER.

Synonyme. Tinct. Lavend. Comp. *L.*

Take of Spirit of Lavender, two pints.
Spirit of rosemary, twelve fluid ounces.
Cinnamon, one ounce.
Cloves, two drachms.
Nutmeg, half an ounce.
Red sandal wood, in shavings, three drachms.

Let the whole macerate for seven days, and then strain the liquor through calico.

Medicinal properties and uses.— Identical with those of Tinct. Lavand. comp., which see.

Dose.— ♏xxx to fʒj.

SPIRITUS MENTHÆ PIPERITÆ, *L. E.*

SPIRIT OF PEPPERMINT.

Take of Oil of peppermint, three fluid drachms.
Proof spirit, a gallon.
Dissolve.

E. Take of peppermint, fresh, ℔jss. Proceed as for spirit of caraway.

Medicinal properties and uses.— *Stimulant; carminative.*

Dose.— ♏xxx to fʒij. It is added to stimulant, narcotic, and purgative draughts.

SPIRITUS MENTHÆ VIRIDIS, *L.*

SPIRIT OF SPEARMINT.

Take of Oil of spearmint, three fluid drachms.
Proof spirit, a gallon.
Dissolve.

Medicinal properties and uses.— Similar to the spirit of peppermint, but not so powerful or agreeable.

Dose.— ♏xxx to fʒij.

SPIRITUS MYRISTICÆ, *L. E.*

SPIRIT OF NUTMEG.

Take of Nutmegs, bruised, two ounces and a half.
Proof spirit, a gallon.
Water, a pint.
Mix them; then, with a slow fire, let a gallon distil.

Dose.— ♏xxx to fʒj.

MYRISTICA MOSCHATA (Diœcia Monadelphia; Myristaceæ).

Description.—*Nutmegs* are brown externally, and are marked by grooves, which run in irregular directions. These are caused by the firm adhesion of its *arillus*, which is known by the name of *mace.*

Mace is not officinal, and is only used as a seasoning to food. It is bright scarlet when fresh, but becomes yellow when dried; and it is always of this colour as seen in the shops.

Composition. — Nutmegs contain a *volatile oil* and also a *fixed solid oil*, which is obtained by crushing them in a mill, after being heated. The volatile oil, when kept, deposits crystals of stearoptene.

Medicinal properties.— *Aromatic ; stimulant ; carminative.*

Characteristic properties. — In *large doses* it is *narcotic*, and it produces *constipation*. The fixed oil is *rubefacient.*

Uses. — As an agreeable addition to purgatives or other medicines, simply on account of its flavour. It may sometimes be substituted for opium in diarrhœa. It should be avoided when there is any tendency to apoplexy or determination of blood to the head.

Dose. — Of the powdered nutmeg, gr. x to ℈j ; of the volatile oil, ♏ij to ♏v ; of the spirit, ♏xxx to fʒij. The fixed expressed oil is only used as an external stimulant.

MYRISTICÆ (ADEPS, *E.*) OLEUM EXPRESSUM.

Expressed Oil of Nutmegs.

Concrete expressed oil of nutmegs is a firm solid, of an orange colour and fragrant odour, and is soluble in alcohol.

Properties.— Rubefacient ; very seldom used.

SPIRITUS PIMENTÆ, *L. E.*

Spirit of Pimenta.

Take of Oil of pimenta, two fluid drachms.
Proof spirit, a gallon.
Dissolve.

E. Take of Pimenta, bruised, ℔ss. Proceed as for the spirit of caraway.

EUGENIA (*Myrtus*) PIMENTA (Icosandria Monogynia ; Myrtaceæ).

Description. — Pimenta, or allspice, takes its name from its flavour, which resembles that of a mixture of many of the other spices. It is a small, round, dark-coloured fruit, and is distinguished from black pepper by the dried calyx, which forms a ring upon its summit. It is distinguished by the same criterion from juniper and from buckthorn berries, which it somewhat resembles in its colour and size.

Composition.— *Volatile oil*, *resin*, and *tannin.*

Medicinal properties.— Similar to other spices. *Aromatic* and *carminative.*

Uses.— Chiefly in cookery. It is added to purgatives and other disagreeable or griping medicines; or it may be taken alone, to correct flatulence.

Dose.— Of the fruit, gr. x to ʒss; of the volatile oil, ♏ij to ♏vi or ♏viii; of the spirit, ♏xxx to fʒj.

SPIRITUS PULEGII, *L.*

SPIRIT OF PENNYROYAL.

Synonyme. Spiritus Menthæ Pulegii, *Ph. L.* 1836.

Take of Oil of pennyroyal, three fluid drachms.
Proof spirit, a gallon.
Dissolve.

Medicinal uses and doses.—The same as the spirit of peppermint.

SPIRITUS ROSMARINI, *L. E.*

SPIRIT OF ROSEMARY.

Take of Oil of rosemary, two fluid drachms.
Rectified spirit, a gallon.
Dissolve.

E. Rosemary, ℔ijss. Proceed as for Spirit of Lavender.

Medicinal uses.— This spirit is sometimes applied locally to prevent baldness. It is chiefly used as an adjunct to other compounds on account of its odour.

Officinal preparations.— Linimentum Saponis. Tinctura Lavandulæ comp.

SULPHUREA.

SULPHUR, *L. D. E.*

Symb. S. Eq. 16. Sp. gr. 2.

Varieties. Roll Brimstone. Flowers of Brimstone. Milk of Sulphur. Precipitated Sulphur. Sublimed Sulphur. S. Vivum.

Description.—Sulphur is a product of volcanic action, and is chiefly obtained from Sicily, where it is dug from beds many yards in thickness. It may be also obtained by roasting sulphuret of copper or of iron, when part of the sulphur is burnt, and the remainder sublimes. When heated to about 600°, it sublimes, and the vapour being collected in closed chambers, it falls in the form of a light yellow powder called *flowers of sulphur* or *flowers of brimstone*, or *sublimed sulphur*. At about 220° it melts, and when poured into moulds forms *roll brimstone*. The residue from the sublimation is a dark powder called *sulphur vivum*.

Properties.—Sulphur is insoluble in water; is *slightly* soluble in alcohol, when they meet in the state of vapour; is rather more soluble in ether; and is readily dissolved by oils, when heated with them; it also dissolves in large quantity when boiled with caustic soda, potash, or lime.

Adulterations.—Sulphur is never fraudulently adulterated, but it sometimes contains a small quantity of earthy matters, and if obtained from iron pyrites (sulphuret of iron), it generally contains some sulphuret of arsenic.

Characters and tests.—Of a citron yellow colour. It is sublimed at 600°. It is dissolved by oil of turpentine, with the aid of heat.

Tests.—It ought to be entirely soluble in hot oil of turpentine, which shows the absence of earthy impurities; and if boiled in nitric acid until it is dissolved, and then diluted with water, no arsenic should be obtained when the solution is exposed to Marsh's test. (See p. 415.)

Medicinal properties.—*Laxative and diaphoretic.* It is never used as a diaphoretic, but when taken internally it partially escapes through the pores of the skin, and occasionally blackens silver articles in the pockets.

Characteristics as a laxative.—Sulphur acts very gently, but certainly; after a few hours; causes soft but not watery stools; is seldom followed by constipation; does not excite inflammation, and relieves the distress from piles in a remarkable degree. It causes offensive flatus in the intestines.

Uses. — As a laxative, in piles, it is the most valuable which we possess. It is given also to delicate women, and when mixed with treacle, is a favourite purgative for children. It is given as an alterative in many cases in which the skin loses its clearness and smoothness, even though no actual eruption is present, and is employed in the form of vapour in many cutaneous diseases, especially scabies, lepra, and psoriasis. For itch it is an almost unfailing remedy, in the form of ointment; after using it for this purpose patients should avoid exposure for a few days, as the skin is sensitive, and they are liable to take cold.

Dose. — ʒss to ʒj, to be repeated if necessary.

SULPHUR PRÆCIPITATUM, *L.*

PRECIPITATED SULPHUR.

Synonyme. Milk of Sulphur.

The London College places this in the Materia Medica, and does not give any directions for making it, except that it is to be prepared by hydrochloric acid. It may be made as follows:—

Boil together 1 part of sublimed sulphur and 2 or 3 parts of slaked lime in 8 or 10 parts of water, until the sulphur loses its yellow colour, and a deep reddish-brown solution is obtained. When sulphuric or hydrochloric acid is added to this, the lime is separated, and the sulphur falls down combined with water; it is then to be washed and dried.

If hydrochloric acid is used, the lime remains in solution in the form of muriate of lime, and the sulphur is separated unmixed with any of it; but if sulphuric acid is used, the lime then falls as sulphate of lime along with the sulphur, and in some cases as much as 20 or 30 per cent. of sulphate of lime is mixed with it in this way.

Characters and tests. — Pale yellow. The water in which it has been boiled does not change the colour of litmus. In other respects it corresponds with sulphur.

Characters. — Milk of sulphur is either almost white or a pale brownish-yellow; the first being the case when sulphuric, the second when muriatic acid has been used. If sulphate of lime is mixed with it, as in the first case, it very readily mixes with water or milk, and may be easily taken in this way; but if it has been precipitated by muriatic acid, and is, therefore, really purer, it can scarcely be got to mix, which is a great disadvantage. One of the chief advantages, if not the only one, which the precipitated possesses over the sublimed sulphur, is that of mixing readily with milk or water, an advantage which is almost entirely lost if it is prepared pure by muriatic acid. I therefore prefer the white, impure milk of sulphur, to that which is brown and pure, and always use it: the sulphate of lime present simply increases the dose, and does not produce any injurious effects.

Uses.—The same as those of sublimed sulphur.

Dose.—ʒss to ʒj (*i.e.* a tea-spoonful) repeated till it produces its effects.

SULPHURIS IODIDUM, *L. D.*

IODIDE OF SULPHUR.

Synonyme. Sulphur Iodatum, *D.*

Take of Sulphur, one ounce.
Iodine, four ounces.

Put the sulphur into a glass vessel, and add the iodine to it; hold the vessel immersed in boiling water until they have combined; then, when the iodide has cooled, break it into small pieces (after breaking the vessel), and keep it in another well-stopped vessel.

About 20 grains of sulphur remain from 100 grains of this compound when long boiled in water.

D. Mix the iodine and sulphur by trituration, and proceed as above.

Properties.—This compound is not intended for internal use, but is employed, in the form of ointment, in cutaneous diseases, especially scabies, lepra, and porrigo.

Officinal preparation.—Unguent. Sulph. Iodidi.

SYRUPI.

SYRUPS.

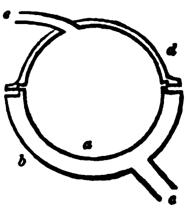
SYRUPS are to be kept in a place where the heat never exceeds 55°.

Remarks. — Nearly all the syrups of the London Pharmacopœia differ from those of Ed. and the last edition, in containing a small quantity of spirit. Syrups are strong solutions of sugar in water, generally coloured or flavoured with vegetable matter; and sometimes, but rarely, they are active medicines. It is necessary that they should be kept in a cool place, or acetic acid will be generated; and this may interfere with medicines with which the syrup is combined.

SUGAR, SACCHARUM OFFICINALE (Triandria Digynia; Gramineæ).

Manufacture.—Sugar is obtained from the juice of the sugar-cane. When the canes are ripe, they are cut down and crushed in a mill: a large quantity of juice flows out, which consists of sugar, mucilage, and vegetable acid, dissolved in water, with shreds of vegetable matter diffused through it; this juice is then mixed with chalk, which neutralises the acid, forms an insoluble salt of lime, and is precipitated. As this precipitate subsides, it mechanically carries down with it much of the loose floating vegetable matter, and also some of the colouring matter, which is chemically combined with it. The liquor is then filtered and evaporated until crystals begin to form, which are brown, and constitute common brown sugar. This is put into hogsheads, having holes at the bottom, through which a dark uncrystallisable liquor (treacle) drains from the coarse sugar.

Process of refining. — Brown sugar is pure sugar mixed with a small portion of uncrystallisable matter, some salts of lime, and much colouring matter. In order to refine it, it is dissolved in water, and heated with bullock's blood and hydrate of alumina; the albumen of the blood is coagulated by the heat, and, rising to the surface, carries with it some of the colouring matter and the insoluble impurities mechanically entangled in it. The liquid is then filtered through animal charcoal, which removes the greater



a, Boiler containing the syrup.
b, Vessel surrounding the boiler, into which steam is constantly admitted through
c, Steam pipe.
d, Head, fitting air-tight upon the boiler, from which the air and moisture are removed through
e, Pipe connected with the air-pump.

part of the remaining colour, and is afterwards evaporated until crystals begin to form. In order to prevent the sugar from being burnt by the heat of the bottom of the boiler, the evaporation is effected in a close vessel, from which the air and moisture are continually removed by an air-pump, by which means the water evaporates at a much lower temperature than if the air were present. The heat is applied, not directly by fire, but by means of steam, which is made to surround the boiler. When crystals begin to form, the liquor is poured into inverted conical moulds, having a hole at the apex; through this hole some of the syrup drains, and the remainder crystallises and forms loaf sugar. Even this, however, is not quite colourless: the remaining colour is removed by pouring a saturated solution of perfectly pure sugar upon the base of the sugar loaf, and allowing it to drain through and escape through the hole in the apex; in so doing it carries with it the whole of the colouring matter, and leaves the sugar perfectly white and pure.

Scoffern's patent process for refining sugar by lead.—A different method has lately been introduced by Dr. Scoffern, who employs a solution of *subacetate of lead*. This combines with the vegetable acids and with the mucus, forming a coagulum and insoluble precipitates, which act in purifying the sugar far better than the old process by chalk, blood, and filtration. As there is always an excess of lead, it is separated by passing sulphurous acid into the solution, which forms an insoluble sulphite of lead, the whole of which metal is stated to be thus removed.

This plan is so much more economical and productive than the old one, that it has been extensively adopted; but suspicion having arisen that the whole of the lead was not removed, but that some still remained in the sugar, the government submitted the matter to a commission, who have reported upon it.* The result of the inquiry has been that the process answers perfectly upon a small scale in the laboratory, but that, upon the large manufacturing scale, a *small* portion of lead does remain in the sugar, which is likely to produce injurious effects upon the health, if long continued.

Composition.—This is variously stated by different chemists. The difference is occasioned by the difficulty of knowing how much water is accidentally present, and how much is essential to the constitution of the sugar. Sugar may be regarded as a hydrate of carbon, and the greater the proportion of carbon, the richer is the sugar.

		C.	H.	O.	
Pure cane sugar	-	6	6	6	*Prout.*
Sugar of grapes	-	6	7	7	*Prout.* (or $C^{12} H^{14} O^{14}$).

Properties.—Pure sugar is soluble in hot and cold water, and also in alcohol. It prevents or retards the absorption of oxygen by various compounds of iron, and is used for this purpose in all the Pharmacopœias. Brown sugar, when dissolved in water and mixed with yest, is capable of undergoing the process of fermentation and of yielding alcohol; but perfectly pure sugar does not undergo this change, which has been described in speaking of alcohol, p. 691.

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* Sugar Refining. Return to an Order of the House of Commons, dated Aug. 14. 1850. Med. Gaz. Nov. 1. 1850.

Medicinal properties and uses.—Sugar is *nutritious* and *demulcent*, and is chiefly used in medicine on account of its agreeable flavour. It also preserves some vegetable bodies from undergoing decomposition. It is employed in the manufacture of lozenges, by means of which various medicinal substances can be slowly swallowed. Powdered sugar is sometimes sprinkled upon ulcers, to promote the contraction of luxuriant granulations, or is blown through a quill into the eye, to remove specks on the cornea.

TREACLE, or *molasses*, is the dark uncrystallisable liquor which drains from the brown sugar when first crystallised. It is laxative when taken in quantities of ℥j or more, and is frequently employed, on this account, as an article of diet for children. It may be exposed to the air for months without becoming dry, and is often used in making pills. It has been proposed that some vegetables which easily decompose, as conia, should be kept in treacle, and it is largely employed for preserving fresh meat for sea voyages.

SACCHARUM LACTIS, *D.*

SUGAR OF MILK.

Preparation.—When milk whey is evaporated to dryness, the residue is a sweet, gritty, semi-crystalline mass called sugar of milk. It is principally made in Switzerland, where it is prepared on a large scale from the residue of cheese manufacture.

Uses.—It has no medicinal properties, and is chiefly used by homœopathists for the preparation of their globules. It has lately been talked of as a valuable and easily assimilated carbonaceous article of diet, for consumptive patients, but the evidence of its special utility is slight.

SYRUPUS, *L. D. E.*

SYRUP.

Synonyme. Syrupus Simplex, *E.*

Take of Sugar, three pounds.
Distilled water, one pint.
Dissolve it with a gentle heat.

D. Sugar, ℔v (avoird.); Water, Oij.
E. Sugar, ℔x; Water, Oiij.

Remarks.—This syrup is not quite so strong as in the old Pharmacopœia in which the proportions were 3½ pounds to a pint, as is still the case in the Ph. Ed. The Dublin syrup appears weaker still, but is very nearly the same strength, making allowance for the different weights used here and in Dublin; the Dublin (avoirdupois) pound being about one-fifth heavier than the London and Edinburgh (apothecaries) pound.

SYRUPUS ACETI, *E.*

Syrup of Vinegar.

Take of French vinegar, eleven fluid ounces.
Sugar, fourteen ounces.
Boil them together.

SYRUPUS ACIDI CITRICI, *D.*

Synonyme. Lemonade.

Take of Citric acid, Distilled water, of each, two ounces and a half.
Tincture of lemon peel, five drachms.
Syrup, three pints.
Dissolve the acid in the water, and then add the tincture and syrup.

SYRUPUS ALTHÆÆ, *L. E.*

Syrup of Marsh Mallow, or Althæa.

Take of Althæa root (fresh and sliced), one ounce and a half.
Sugar, three pounds, or sufficient.
Distilled water, one pint.
Rectified spirit, two fluid ounces and a half, or sufficient.

Macerate the marsh mallow in the water for twelve hours; press out the liquor, and strain it through linen; then add twice as much sugar (by weight) as there is liquid, and dissolve it with a gentle heat; then, when the syrup has cooled, add half a fluid drachm of spirit to each ounce.

E. Althæa root, fresh sliced, ℥viij; Boiling water, Oiv; Sugar, ℔ijss.

Boil the althæa root with the sugar down to two pints; strain, and express strongly through calico; let the impurities subside, and dissolve the sugar in the clear liquor, with the aid of heat.

Remarks.—The formula in the Ph. L. is different this time in both proportions and ingredients, as it contains less althæa than it did formerly, and now has spirit added, which it formerly had not. The Ed. directions are precisely the same as those of the old Ph. L.

ALTHÆA OFFICINALIS (Monadelphia Polyandria; Malvaceæ).

Remarks. — The marsh mallow resembles the common mallow in properties, and is not very dissimilar in appearance; its leaves are, however, undivided, or three-lobed, whilst those of the common mallow are five or seven-lobed; its flowers, also, are paler.

Composition. — *Mucilage* and *starch*, in nearly equal proportions, and an *inactive* substance called *althein.*

Properties and uses. — *Emollient* and *demulcent*, and a decoction is employed when these properties are required. The syrup is used as a demulcent in cough medicines for children. Owing to the quantity of mucilage, it is liable to ferment and become ropy.

Dose. — fʒj to f℥ss.

SYRUPUS AURANTII, *L. D. E.*

SYRUP OF ORANGE (PEEL).

Take of Orange peel, dried (fresh, *E.*). two ounces and a half.
Distilled water, boiling, a pint.
Sugar, three pounds, or sufficient.
Rectified spirit, three ounces and a half, or sufficient (not in *D.* or *E.*).

Macerate the peel in the water for twelve hours, in a covered vessel, express the liquid, and boil it for ten minutes; then strain, and proceed as in Syrupus Althææ.

E. Similar to the above, but without spirit.

Remarks. — This syrup has a stronger but less agreeable flavour of orange than the old one, in consequence of dried, instead of fresh peel being ordered. The boiling, now introduced, is for the purpose of coagulating the mucus, which is otherwise liable to make syrup ropy when long kept; it is to be separated by filtration before adding the sugar. The heat has, however, the effect of impairing the aroma of the orange peel. A temperature below that of boiling (about 160° or 180°) is sufficient to coagulate the mucus, and does not injure the flavour so much. There was no spirit in the old Pharmacopœia.

Uses. — It is only used for its flavour.

SYRUPUS COCCI, *L.*

Syrup of Cochineal.

Take of Cochineal, powdered, four scruples.
Boiling distilled water, one pint.
Sugar, three pounds, or sufficient.
Rectified spirit, two fluid ounces and a half, or sufficient.

Boil the cochineal in the water for a quarter of an hour, in a covered vessel, frequently stirring, then strain, and proceed as in Syrupus Althææ.

Uses. — Merely for the sake of its colour.

SYRUPUS CROCI, *L. D. E.*

Syrup of Saffron.

Take of Saffron, five drachms.
Distilled water, boiling, a pint.
Sugar, three pounds, or sufficient.
Rectified spirit, two fluid ounces and a half, or sufficient.

Macerate the saffron in the water for twelve hours in a covered vessel, then strain the liquor, and proceed as for Syrupus Althææ.

E. Saffron, ʒx; Sugar, ℔iij; Water, Oj.
D. Saffron, ℥ss; Water, Oj; Sugar, sufficient.

Remarks. — This syrup contains only half the quantity of cochineal which it formerly did. It is only one of a multitude of instances in which the Edinburgh College, having altered their formulæ to make them correspond with those of the Ph. L., the latter college has altered its directions in the new Pharmacopœia. The Edinburgh directions and proportions are precisely those of the old Ph. L.

CROCUS SATIVUS (Triandria Monogynia; Iridaceæ).

Description and varieties. — Saffron occurs in two forms: as *hay* and *cake saffron.* In the former, the stigmata are separated from each other in the drying, and may be easily distinguished. They are from an inch to an inch and a half long; thin, brownish-red, and notched at the expanded extremity. *Cake* saffron is generally much adulterated, and consists chiefly of the petals of the saffron flower (*Catharmus tinctorius*), pressed together with gum water.

The fraud may be detected by soaking the mass in warm water, when the petals will expand, and may be easily distinguished by their petaloid form, their size, and the absence of the notched expanded extremity.

Composition.— *Volatile oil*, and the colouring principle, called *polychroit*, from the numerous changes of colour of which it is susceptible.

Medicinal properties. — Saffron has been considered *cordial*, *narcotic*, and *emmenagogue*, and for this last property is still retained in some compounds which are used as emmenagogues. It is extensively employed in some places for the flavour and colour which it communicates to confectionery.

Uses. — Chiefly as a colouring ingredient. It is a popular remedy for assisting the eruption of exanthematous diseases.

Dose. — Gr. x to ʒj, in powder or pill, or made into infusion or *tea*. A few drops, for the sake of colour, are sufficient.

SYRUPUS FERRI IODIDI, *L.D.E.*

Syrup of Iodide of Iron.

For the London and Edinburgh formulæ, see Metals,—Syrup. Ferri Iodidi, p. 464.

D. Iodine, ʒv; Iron turnings, ʒiij; Distilled water, f℥ij; Syrup, ℥vi. Introduce the iodine, iron, and water, into a glass flask, and apply heat until the solution loses its red colour; filter the solution, while hot, into a bottle containing the syrup; mix with agitation, and add distilled water to make up eight fluid ounces.

One fluid drachm contains gr. v of iodide of iron.

Dose.—♏xx to fʒij. The three pharmacopœias agree in strength.

For the properties and uses, see Metals, — Ferri Iodidum, p. 463.

SYRUPUS FERRI ET MANGANESII IODIDI. (Not Off.)

Syrup of Iodide of Manganese and Iron.

The following formula has been proposed by Mr. W. Procter, Jun.[*], as a substitute for the syrup used by M. Petrequin, which is made by a process that does not always yield a uniform result, which the following plan does.

Take of Iodide of potassium, 1000 grs.
Proto-sulphate of iron (green in crystals), 630 grs.
Proto-sulphate of manganese, 210 grs.
Iron filings, free from rust, 100 grs.
White sugar, in coarse powder, 4800 grs.
Distilled water, a sufficiency.

Triturate the sulphates and the iodide separately to powder; mix them with the iron filings; add half an ounce of water, and triturate to a uniform paste. After standing a few minutes, again add half an ounce of water; triturate and allow it to rest fifteen minutes. Then add another half ounce of water and mix. Introduce the sugar into a twelve-ounce bottle, and put the magma of salts into a moistened filter, and allow the dense solution to drain into the sugar. Then carefully add repeated small portions of distilled water to the salts remaining in the filter as long as the mass retains a well-marked taste of the iodides. Frequently agitate the bottle containing the sugar during the process of filtration, and lastly add water to fill up the twelve ounces. If necessary, place the bottle in a water bath to promote the solution of the sugar.

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[*] Amer. Jour. of Pharm., copied into the Ph. Jour. Aug. 1853, p. 88.

Explanation.—When the salts above directed are mixed together in powder and moistened, the sulphuric acid of the sulphates combines with potash formed from the potassium of the iodide, and forms sulphate of potash, whilst the iodine combines with the iron and manganese to form iodide of iron and iodide of manganese, which are simply mixed together; sulphate of potash is but slightly soluble in water, and the quantity of water used, being very small, it only dissolves the iodides, and the sulphate of potash remains behind on the filter. The iron filings are merely to combine with any iodine that may happen to be set free during the process. The length of time mentioned in the directions must not be abridged.

Characters.—This syrup has a very pale straw colour, unless some of the sulphate of iron has escaped decomposition, in which case it will have a green tint.

Medicinal properties and uses.—See FERRI ET MANGANESII CARBONAS, pp. 526. 525.

Strength of the syrup.—Each fluid ounce contains 77* grains of the mixed iodides in the proportion of three grains of iodide of iron to one grain of iodide of manganese.

Dose.—♏x to ♏xxx, *i. e.* gr. 1⅔ to gr. v.

SYRUPUS HEMIDESMI, *D.*

SYRUP OF HEMIDESMUS OR INDIAN SARSAPARILLA.

Take of Indian sarsaparilla, bruised, four ounces.
Boiling distilled water, one pint.
Sugar, sufficient.

Infuse the sarsaparilla in the water for four hours in a covered vessel, and strain; set it by until the sediment subsides, then decant the clear liquor, and having added to it twice its weight of sugar, dissolve with the aid of a steam or water heat.

Dose.—f℥j to f℥ss.

HEMIDESMUS INDICUS.

INDIAN SARSAPARILLA (Pentand. Digynia; Asclepiadaceæ).

Description.—Hemidesmus root is more like sarsaparilla than any other officinal root, but it is about twice the thickness, and has no root fibres attached.

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* In Mr. Procter's paper (Ph. Jour.) it says "50 grains," but unless there is some loss of materials (which does not appear to be the case), the quantity by calculation is really 77·3 grains.

Medicinal properties and uses.—It has been used in India as a substitute for sarsaparilla in the diseases in which that root is employed, but its powers, if any, are very feeble, and it is chiefly, if not entirely, on account of its agreeable aromatic flavour, that it is used in this country, or admitted into the Dublin Pharmacopœia.

SYRUPUS IPECACUANHÆ, *E.*

Take of Ipecacuanha, in coarse powder, four ounces.
Rectified spirit, one pint.
Proof spirit,
Water, of each, fourteen fluid ounces.
Syrup, seven pints.

Digest the ipecacuanha in fifteen fluid ounces of the rectified spirit at a gentle heat for twenty-four hours; strain; squeeze the residuum, and filter; repeat this process with the residuum and proof spirit; and again with the water. Unite the fluids, and distil off the spirit till the residue amounts to twelve ounces; add to the residuum five fluid ounces of the rectified spirit, and then the syrup.

Properties and uses.—This is a convenient mode of giving ipecacuanha to children as an expectorant. It is not so available as an emetic, because the quantity of the drug is small, compared with the amount of syrup.

Dose.—One tea-spoonful (f℥j) contains 1¼ gr. of ipecacuanha, from which the dose must be fixed, according to the intention with which it is given.

SYRUPUS LIMONUM, *L. E.*

SYRUP OF LEMONS.

Take of Lemon juice, strained, one pint.
Sugar, two pounds and a half.
Rectified spirit, two fluid ounces and a half.

Boil the juice for ten minutes, and strain; add the sugar, and dissolve it; then, when the syrup has cooled, add the spirit.

E. Lemon juice, Oj; Sugar, ℔ijss.

Remarks.—The object of the boiling and straining is to coagulate and remove the mucus, previous to dissolving the sugar. If made into syrup first, the coagulum separates less easily; and, if not separated, the mucus is liable to render the syrup ropy.

Uses.—It has an agreeable acid flavour.

SYRUPUS MORI, *L.*

SYRUP OF MULBERRY.

Take of Mulberry juice, strained, a pint.
Sugar, two pounds and a half.
Rectified spirit, two fluid ounces and a half.

Dissolve the sugar in the juice with a gentle heat, and set aside for twenty-four hours; then remove the scum, and pour off the clear liquor from the dregs, if there are any. Lastly, add the spirit.

MORUS NIGRA (Monœcia Tetrandria; Urticaceæ).

Remarks.—Mulberries form an agreeable refrigerant aliment. They contain tartaric acid, and a fine red colouring matter, and may be used in febrile affections, unless there is a tendency to diarrhœa. It is principally for their colour that they are employed in medicine.

SYRUPUS MORPHIÆ ACETATIS, *D.*

SYRUP OF ACETATE OF MORPHIA.

Take of Solution of acetate of morphia, one fluid ounce.
Simple syrup, fifteen fluid ounces.

Mix.

Remarks.— One ounce of this syrup contains gr. ¼ of acetate of morphia.

SYRUPUS MORPHIÆ MURIATIS, *D.*

SYRUP OF MURIATE OF MORPHIA.

Take of Solution of muriate of morphia, one fluid ounce.
Simple syrup, seventeen fluid ounces.

Mix.

Remarks.— One fluid ounce of this syrup contains gr. ¼ of muriate of morphia.

SYRUPUS PAPAVERIS, *L. E.*

SYRUP OF POPPY.

Take of Poppy capsules, the seeds having been removed, three pounds.
Sugar, five pounds.
Boiling distilled water, five gallons.
Rectified spirit, five fluid ounces.

Boil the water with the poppy heads to two gallons, and squeeze strongly. Again boil the strained liquor to four pints, and strain it whilst hot; set aside for twelve hours, that the dregs may subside; then boil the clear liquor to two pints, and dissolve the sugar in it. Lastly, mix the spirit.

E. Poppy heads without the seeds, ℔jss; Boiling water, Oxv; Sugar, ℔iij.

Slice the poppy heads, infuse them in the water for twelve hours; boil down to five pints; strain, and express strongly through calico; boil again to two pints and a half, then add the sugar, and dissolve it with the aid of heat.

Remarks. — The directions in the present Pharmacopœia are an improvement upon the old ones. The seeds being removed previous to making the syrup, there is no oil present, which formerly tended to make the syrup decompose. The repeated boilings and strainings are ordered with the intention of coagulating and removing the vegetable mucus, which renders the syrup liable to spoil, and the spirit is added with the intention of making it keep better than formerly.

Properties and uses. — Syrup of poppy is an *anodyne* and *sedative*, but is much less powerful in its operation than laudanum or any preparation of opium, and is less liable to cause subsequent headache or nausea. It is principally employed for children, but is an agreeable ingredient in pectoral mixtures for adults. This syrup is very liable to ferment, especially if carelessly made, or if too little sugar is employed. A mixture of treacle and a few drops of laudanum is sometimes substituted for it; but the fraud is a very injurious one, as instances have occurred in which infants have been killed by this means. The syrup is not without danger, if given in too large a dose.

Dose. — For an infant three months old, ♏x to ♏xxx; if an adult, f℥j to f℥iv.

SYRUPUS RHAMNI, *L. E.*

Syrup of Buckthorn.

Take of Buckthorn juice (fresh), four pints.
Ginger, sliced,
Pimenta, powdered, each, six drachms.
Rectified spirit, six fluid ounces.
Sugar, six pounds.

Set by the juice for three days, that the dregs may subside; and strain. To a pint of the clear juice add the ginger and pimenta; then macerate with [illegible] heat for four hours, and strain; boil down what is left to the measure of a pint and a half; mix the liquors, and dissolve the sugar in them. Lastly, add the spirit.

E. Fresh juice of Buckthorn berries, Oiv; Ginger, Pimenta, each, ℥vi; Sugar, ℔iv.

BUCKTHORN, RHAMNUS CATHARTICUS (Pentandria Monogynia; Rhamnaceæ).

Description. — Buckthorn berries are similar in appearance to roasted coffee berries, but their colour is paler, and they have no longitudinal furrow on their flat side.

Composition. — The purgative principle is not fully known; it does not reside wholly in the juice, for that is not nearly as active as the fresh berries.

Medicinal properties. — *Drastic hydragogue cathartic.* It causes copious watery stools which contain little feculent matter. Its operation is attended with nausea and griping, and severe thirst. If a moderate dose does not operate, a larger one is not more successful. It is only adapted to young and robust patients. Owing to the severity of its operation and the other disagreeable symptoms which it causes, it has fallen almost into disuse; but it is unquestionably a powerful remedy.

Uses. — *Dropsies*, in robust patients.

Dose. — Of the recent berries, 25 or 30; of the dried berries, ʒj; of the expressed juice, f℥ss to f℥j; of the syrup, f℥ss to f℥j.

SYRUPUS RHŒADOS, *L.E.*

SYRUP OF RED POPPY.

Take of Red poppy (petals), a pound.
Boiling distilled water, a pint.
Sugar, three pounds, or sufficient.
Rectified spirit, two fluid ounces and a half, or sufficient.

Add the (petals of the) red poppy gradually to the water, heated in a water-bath, frequently stirring them; then, the vessel being removed, macerate for twelve hours; afterwards press out the liquor with the hand, and strain; and proceed as is directed for the Syrupus Althææ.

E. Red poppy petals, ℔j; Water, Oj; Sugar, ℔ijss.

Remarks. — This syrup has a fine red colour, and is used only on that account. It has not any narcotic properties. It should not be *added to alkaline* mixtures, as they change the colour to a muddy hue, nor to mixtures containing chlorine which bleaches it. The quantity of sugar is greater than in the old Pharmacopœia.

SYRUPUS ROSÆ, *L. E.*

Syrup of Damask Rose.

Synonyme. Syrupus Rosæ Centifoliæ, *E.*

Take of Damask rose (petals) fresh, seven ounces.
Sugar, six pounds.
Boiling distilled water, three pints.
Rectified spirit, five fluid ounces and a half.

Macerate the rose petals in the water for twelve hours, and strain; evaporate the strained liquor in a water-bath to two pints, and dissolve the sugar in it. Lastly, add the spirit.

E. Fresh damask rose petals, ℔j; Water, Oiij; Sugar, ℔iij.

Medicinal uses. — *Gently purgative.* It is sometimes given to infants. The colour very quickly changes and becomes paler. The Edinburgh syrup contains nearly twice the weight of rose leaves, but no spirit, and only half the weight of sugar.

SYRUPUS ROSÆ GALLICÆ, *D. E.*

Syrup of Red Rose.

Take of the petals of the red (*E.*), Gallic (*D.*), rose, dried, two ounces.
Boiling distilled water, one pint.
Sugar, twenty pounds (*E.*), sufficient (*D.*).

Proceed as for the Syrup of Damask rose.

Remarks. — This syrup is only used for the sake of its colour and flavour.

SYRUPUS SARZÆ, *L. D. E.*

Syrup of Sarsaparilla.

Take of Sarsaparilla, three pounds and a half (℔viii, *D.*)
Boiling distilled water, three gallons.
Sugar, one pound and a half (sufficient, *D.*).
Rectified spirit, two fluid ounces.

Boil the sarsaparilla in two gallons of the water down to one gallon; pour off the liquor, and strain it whilst still hot; boil the sarsaparilla again in the remaining water to one half, and strain. Evaporate the liquors, mixed together, to two pints, and dissolve the sugar in them; lastly, when they have cooled, mix the spirit.

E. Sarza in chips, ℥xv; Boiling water, cong.; Sugar, ℥xv. Infuse the sarsaparilla in the water for twenty-four hours; boil down to twelve pints, and strain the liquor while hot; add the sugar, and evaporate to the consistence of syrup.

Remarks.—This is the most valuable of the preparations of sarsaparilla, and contains the virtues of that drug, whatever they are, in the most concentrated and useful form. When given along with some mild salt of iron, *e. g.* the potassio-tartrate, it is a valuable tonic in the latter stages of diarrhœa in anæmiated children.
Dose.—f ʒj or more.

SYRUPUS SCILLÆ, *D. E.*

Syrup of Squill.

D. Take of Vinegar of squill, f℥viij; Sugar, ℔j.
E. Vinegar of squill, Oiij; Sugar, ℔vij.
Dissolve the sugar with the acid at a gentle heat.

Uses.—Those of squill generally; chiefly used for children.
Dose.—♏xxx to fʒj.

SYRUPUS SENNÆ, *L. D. E.*

Syrup of Senna.

Take of Senna, three ounces and a half.
Fennel, bruised, ten drachms.
Manna, three ounces.
Treacle, three pounds.
Boiling distilled water, a pint.

Macerate the senna and fennel in the water with a gentle heat for six hours; press the liquor strongly through linen, and strain; and mix the manna with it. Evaporate the treacle in a water-bath until it becomes almost solid when removed from the bath, and add the liquor to it whilst still hot, constantly stirring until they are mixed.

E. Senna, ℥iv; Boiling water, Oj and f℥iv; Treacle, f℥xlviii. Infuse the senna in the water for twelve hours; strain, and express strongly through calico, so as to obtain a pint and two fluid ounces, at least, of liquid. Concentrate the treacle in the vapour-bath, until a little taken out upon a rod becomes nearly concrete on cooling; and, while the treacle is still hot, add the infusion, stirring carefully, and removing the vessel from the vapour-bath as soon as the mixture is complete.

If Alexandrian senna is used for this preparation, it must be carefully freed of Cynanchum leaves by picking it.

Medicinal uses. — This syrup is chiefly used for children.

Dose. — Two table-spoonfuls contain about ʒss of senna, from which the dose must be estimated.

SYRUPUS TOLUTANUS, *L. D. E.*

Syrup of Tolu.

Take of Balsam of Tolu, ten drachms (℥j, *D.*).
Boiling distilled water, a pint.
Sugar, two pounds and a half.

Boil the balsam in the water for half an hour in a vessel lightly covered, frequently stirring, and strain the cooled liquor; then add the sugar, and dissolve it.

E. Simple syrup, ℔ij; Tincture of Tolu, f℥j. When the syrup has been recently prepared, and has not altogether cooled, add the tincture of Tolu by degrees, agitating briskly.

Employed as an agreeable, slightly stimulating adjunct to pectoral mixtures, in doses of ♏xx to fʒj. It should not be used in *acute* bronchitis.

SYRUPUS VIOLÆ, *L. E.*

Syrup of Violets.

Take of Violets (fresh), nine ounces.
Boiling distilled water, a pint.
Sugar, three pounds, or sufficient.
Rectified spirit, two ounces and a half, or sufficient.

Macerate the violets in the water for twelve (twenty-four, *E.*) hours, then express (do *not* express, *E.*), and strain. Set aside that the dregs may settle, and proceed as for Syrupus Althææ.

E. Fresh violets, ℔j; Water, Oijss; Sugar, ℔viiss.

Remark. — The colour of this syrup is improved by making it in a tin or pewter vessel.

Properties.— Syrup of violets is used as a test for both acids and alkalies; the former changing its blue colour to red, and the latter to green. Its only medicinal employment is as a *laxative* to newborn infants, in doses of half a tea-spoonful to a tea-spoonful with an equal quantity of oil of almonds.

VIOLA ODORATA, THE SWEET VIOLET (Pentandria Monogynia; Violaceæ).

This is too well known to require description. The flowers contain an odorous principle, which has not been isolated, and a crystalline principle termed *violine*, which is emetic. The medicinal property of the flowers is, however, *laxative;* of the root, *emetic*, in doses of ʒss to ʒj.

Officinal preparation. — Syrupus Violæ.

SYRUPUS ZINGIBERIS, *L. D. E.*

SYRUP OF GINGER.

Take of Ginger, sliced, two ounces and a half.
Boiling distilled water, a pint.
Sugar, two pounds and a half, or sufficient.
Rectified spirit, sufficient (not in *E.*).

Macerate the ginger in the water for four hours, express the liquor and strain; and proceed as for Syrupus Althææ.

D. Tincture of ginger, f℥j; Simple syrup, f℥vii. Mix.

Medicinal uses. — This syrup is impregnated with the flavour and warmth of the ginger, and is a useful adjunct to bitter infusions and griping purgatives.

Dose. — f℥ss or more.

SYRUPUS ZINCI IODIDI.

See METALLICA, p. 616.

TINCTURÆ.

TINCTURES.

All tinctures should be prepared in stopped glass vessels, and frequently shaken during maceration.

E. "*Percolation.* — According to this process (which is much superior to the old method by maceration), the solid materials, usually in coarse or moderately fine powder, are moistened with a sufficiency of the solvent to form a thick pulp; in twelve hours, or frequently without any delay, the mass is put into a cylinder of glass or porcelain, or tinned iron, open at both ends but obstructed at the lower end by a piece of calico or linen, tied tightly over it as a filter; and the pulp being packed by pressure, varying as to degree with various articles, the remainder of the solvent is poured into the upper part of the cylinder, and allowed gradually to percolate.

"In order to obtain the portion of the fluid which is kept in the residuum, an additional quantity of the solvent is poured into the cylinder until the tincture which has passed through equals in amount the spirit originally prescribed; and the spirit employed for this purpose is then recovered for the most part by pouring over the residuum as much water as there is of spirit retained in it, which may easily be known by an easy calculation in each case.

"The method by percolation, where applicable, will be found more convenient and expeditious than the mode hitherto commonly followed, and it exhausts the solid materials, in general, much more completely. As considerable practice, however, is required for managing the details in different cases, more especially in regard to the degree of minuteness of division of the solids, and the degree of firmness with which they are to be packed into the cylinder, we have thought it right to direct that the method of maceration may be followed as an alternative; but the method by percolation is now preferred by all who have made sufficient trial of it to apply it correctly."

Remarks. — Tinctures are solutions of various substances in spirit of wine, of different degrees of strength; they are principally prepared from vegetable matters, but in some cases metallic salts are dissolved in it; in other instances tinctures contain ammonia; and, in one case, animal matter is dissolved by spirit.

Tinctures which hold resinous matter in solution, such as that of guaiacum, suffer decomposition on the addition of water. *When it is desirable to mix them with water, treacle or syrup must be used, and not mucilage, as the rectified spirit in such tinctures coagulates the gum, and prevents its uniform diffusion through the mixture.*

Macerate for seven (
press and filter.

Remarks. — The Dublin ti
London one, which is itself sc
tinctures hitherto kept by dru
Medicinal properties and us
and sedative, especially in *neu*
relieves the pain more effectı
in many cases does not cause
pression so common after opiu
Dose. — ♏iij to ♏x, or e
the smaller doses the most effic
be repeated until an interval
the first edition of this work
or more, on the authority of c
which that dose had been exc
have been recorded from the u
more than ♏xv, that I should
stating or using so large a dose
ought at any rate to be most c
before the large one is adminis

TINCTURA

TINCTURI

Take of Aloes (Socotrir
dered, an ou
Extract of liqu
Distilled water

This tincture cannot, without difficulty and delay, be prepared by percolation.

Properties. — Stimulant; purgative.

Dose. — fʒj or fʒij, in combination with other purgatives or f℥ss to f℥j, taken alone.

TINCTURA ALOËS COMPOSITA, *L.*

COMPOUND TINCTURE OF ALOES.

Synonyme. Elixir Proprietatis.

Take of Aloes (Socotrine or hepatic), coarsely powdered, four ounces.
Tincture of myrrh, two pints.
Macerate for seven days, and strain.

Medicinal properties and uses. — *Purgative; stomachic.* Used as a tonic stimulant. Purgative in chlorosis.

Dose. — fʒj to fʒij.

TINCTURA ALOES ET MYRRHÆ, *E.*

TINCTURE OF ALOES AND MYRRH.

Take of Aloes (Socot. or Ind.) in coarse powder, four ounces.
Saffron, two ounces.
Tincture of myrrh, two pints.
Digest seven days, and filter. This tincture cannot be well prepared by percolation.

Dose, &c. — Same as Tr. Aloës Co. (above.)

TINCTURA AMMONIÆ COMPOSITA, *L.*

COMPOUND TINCTURE OF AMMONIA.

Synonyme. Spiritus Ammoniæ Succinatus. Eau de Luce.

Take of Mastich, two drachms.
Rectified spirit, nine fluid drachms.
Oil of lavender, fourteen minims.
Stronger solution of ammonia, a pint.
Macerate the mastich in the spirit, that it may be dissolved, and pour off the clear tincture; then, the other ingredients being added, shake them all together.

Remarks upon the compound tincture of ammonia. — This compound is milky, owing to the separation of the mastich from its spirituous solution by the ammonia. It is *antispasmodic* and *stimulant*, and is occasionally used in hysteria in doses of ♏x to ♏xx. It is added by druggists to carbonate of ammonia, to increase its pungency when employed as smelling salts.

MASTICH, Pistachia Lentiscus (Diœcia Pentandria; Terebinthaceæ).

Description. — Mastich is obtained by making incisions into the bark of the Pistachia lentiscus, from which a juice exudes in tears that sometimes adhere to the stem, and at others fall upon the ground. Mastich is in small pieces, round, flattened, or irregular in shape; of a pale yellow colour, sometimes almost white. It is brittle when cold, but soon softens in the fingers, and is tenacious when chewed. The odour is fragrant, and the taste agreeable.

Substances for which it may be mistaken. —Amber, or manna. Its tenacity, odour, and different flavour distinguish it from both; and amber does not soften in the fingers as mastich does.

Composition. — Small quantity of *volatile oil*, and about 90 per cent. of *resin*.

Properties and uses. — Mastich has been given to check old gleets, but is seldom employed internally. Dentists use it for filling carious teeth, and it is employed by the Turks as a masticatory for sweetening the breath. Dissolved in spirit, it forms an excellent varnish. It forms an ingredient in dinner pills.

Dose.—Gr. ij or gr. iij.

TINCTURA ARNICÆ. (Not Off.)

Tincture of Arnica.

Take of Arnica flowers, one ounce and a half.
Rectified spirit, one pint.

Macerate for seven days, and strain; or prepare it by percolation, after macerating the flowers with a little spirit for a few hours.

ARNICA MONTANA (Compositæ; Corymbiferæ; Syngenes; Polygamia. Superflua).

Description. — Arnica being a composite flower somewhat resembling a marigold, the flowers, when dried, are not unlike what that plant would be if also dried. When prepared for sale they are generally pulled in pieces, and separated from the green receptacle, which is not known to be equally powerful with the flowers.

Medicinal properties and uses.— Arnica is said by homœopathists to possess the most wonderful virtues; but it is chiefly employed by ordinary practitioners in the treatment of *sprains* and *bruises*, in which it often produces speedy and marked relief. It may be applied either undiluted by means of a camel's hair pencil, or as a fomentation in the proportion of ℥j of the tincture, to Oj of hot water. It is said to be a stimulant tonic when taken internally in cases of nervous prostration, amaurosis, typhoid fevers, chlorosis, and asthenic inflammations; but it has not received sufficient trial in these diseases in this country to warrant any strong expressions regarding its efficacy. It is spoken of by Wilde* in the following manner:—"To relieve *tinnitus aurium*, after the inflammatory action has been subdued, or the original disease which produced it has subsided, and particularly in cases where we find this symptom present without any apparent lesion of the parts we are able to inspect, I have found the preparations of the Arnica montana of decided benefit; indeed it is the only medicine with which I am acquainted that seems to possess a specific power over this annoying, and usually most intractable complaint. The preparation I find most efficacious is the tincture both of the flowers and leaves, of which the patient should commence by taking fifteen drops in ℥ss of the infusion of arnica†, with some cordial tincture three times a day. After a few days the dose should be increased by one or two drops daily, till it reaches thirty or even more, unless headache or giddiness is produced, when we should at once lessen the dose or omit the medicine altogether for a short time. The state of the bowels should be carefully attended to during the administration of this drug."

Dose.—♏xv to ♏xxx or fʒj. For fomentations f℥j in Oj or Oij of hot water.

TINCTURA ASSAFŒTIDÆ, *L. D. E.*

TINCTURE OF ASSAFŒTIDA.

Synonyme. Tinctura Fœtida.

Take of Assafœtida, broken into small pieces, five ounces.
Rectified spirit, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

E. Not to be made by percolation.

Medicinal properties and uses.—*Stimulant; antispasmodic.* This tincture is rendered turbid when mixed with water, owing to the precipitation of the resinous matter of the assafœtida. Pennyroyal water is a good vehicle for its administration. It is employed in *hysteria* and *flatulent colic*, and is frequently substituted for the mixture of assafœtida.

Dose.—fʒss to f℥jss.

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* Aural Surgery, pp. 96. and 255.

† Infus. Arnicæ Florum. Ph Castr. Ruth. Arnica flowers, ʒss; Boiling water, ℔j. Infus. Arnica Radicis Ph. Castr. Ruth. Arnica root, ℈ij; Boiling water, ℔j.

TINCTURA AURANTII, *L. D. E.*

Tincture of Orange (Peel).

Take of (Bitter, *D. E.*) orange peel, dried, three ounces and a half (℥iv, *D.*).
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days, then express and strain.

CITRUS (Polyadelphia Polyandria; Aurantiaceæ).

Description and varieties. — The *Citrus aurantium*, or *sweet orange*, yields the fruit which is so agreeable an article of diet, and the flowers from which the Aqua florum aurantii is distilled. It also yields the oil of orange, which is employed merely for its fine odour. The rind of this orange is smooth and thin.

The *Citrus vulgaris*, or *Seville* or *bitter orange*, has a thicker rind, which is rough and uneven, and very bitter. The flowers yield a more fragrant distilled water and volatile oil (oil of neroli) than those of the sweet orange. It is the rind of the bitter orange which is employed medicinally.

Composition. — The rind contains a *volatile oil*, called oil of neroli. The juice of both species contains *citric* and *malic acids*, *sugar*, and *gum*.

Medicinal properties.— *Aromatic; stomachic;* and *tonic.* Chiefly used on account of its flavour. The bitter orange possesses these characters in a higher degree than the sweet. If the rind of the sweet orange is eaten in considerable quantity, it sometimes produces colic and even convulsions in young children.

Uses.—The tincture is employed chiefly as a grateful adjunct to other vegetable tonics, or to saline and effervescing mixtures. The dried unripe fruit (baccæ aurantii), though not officinal, is often used instead of peas for keeping issues open, on account of its aroma, which is thought to be an advantage.

Dose.— Of the tinctures fʒss to fʒij.

TINCTURA BELLADONNÆ, *L. D.*

Tincture of Belladonna.

Take of Belladonna (leaves), dried, four ounces (℥v, *D.*).
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

Properties and uses.—See Extract. Belladonnæ, p. 309. This tincture is very seldom used, and then chiefly in liniments.

Dose.—♏ij to ♏iv; or, as an anodyne liniment, f℥j is added to ℥iv of soap liniment.

TINCTURA BENZOINI COMPOSITA, *L. E.*

COMPOUND TINCTURE OF BENZOIN.

Synonyme. Friar's Balsam.

Take of Benzoin, coarsely powdered, three ounces and a half.
Prepared storax, two ounces and a half.
Balsam of Tolu, ten drachms.
Aloes (Socotrine or hepatic), coarsely powdered, five ounces.
Rectified spirit, two pints.
Macerate for seven days, and strain.

E. Benzoin, ℥iv; Peru balsam, ℥ijss; E. I. Aloes, ℥ss; Rectified spirit, Oij. Digest seven days.

BENZOIN, STYRAX BENZOIN (Decandria Monogynia; Styraceæ).

This is always solid, and has a variegated or mottled appearance from the mixed red and white glistening tears which form the mass. Its odour is peculiar and highly fragrant.

STORAX, STYRAX OFFICINALE (Decandria Monogynia; Styraceæ).

This is found in two states, liquid and solid. The *liquid storax* has a grey colour, a peculiar fragrant odour, and the consistence of thick honey. *Common storax* is a light, brittle solid, which has a grey colour, and evidently contains saw-dust. It has frequently a mouldy appearance, owing to an efflorescence of benzoic acid. It appears to consist of liquid storax, rendered solid by the intentional addition of saw-dust.

Extraction.—Benzoin. Longitudinal incisions are made into the tree, below the branches, from which the finest benzoin exudes and soon hardens. An inferior kind is obtained by splitting the tree and scraping the wood.

Storax is obtained likewise from incisions into the wood, and the young branches yield an additional quantity when subjected to pressure.

Composition.—Both benzoin and storax contain a *volatile oil*, *resin*, and *benzoic acid.* This last ingredient is obtained in larger quantity from benzoin than from any other substance. It is probable that it does not exist naturally in the balsam in so large a proportion as may be obtained by means of subli[illegible] for if all the benzoic acid which can be removed by carbonate of potash is separated from benzoin, the remaining mass will still yield a large quantity of acid when subjected to heat; it appears, therefore, that, under the influence of heat, the elements of the benzoin are re-arranged so as to form this acid. There are some very interesting theoretical considerations connected with benzoin, but they belong rather to Chemistry than to Materia Medica.

Medicinal properties. — Similar to those of Tolu and Peruvian balsams, p. 733; but benzoin is more irritating, and hence is liable to disorder the stomach.

Uses.—Similar to those of Tolu and Peruvian balsams, but still more valuable in the *chronic bronchitis* of old people. Under the name of Friar's balsam, the compound tincture of benzoin has long been a popular application to wounds, and is also much used by surgeons. The cases best suited to its employment are lacerated or contused wounds, or wounds in parts where it is difficult to procure adhesion; in these cases it gently stimulates the injured parts, and frequently prevents the occurrence of sloughing. If it is applied by means of lint, it adheres firmly and excludes the air and dirt (in the case of workmen) from the wound. It is sometimes applied upon a dossil of lint to compound fractures where the external wound is small, and the protruding bone is withdrawn; in this way the wound is closed and the air excluded until it has united, and the compound fracture is thus converted into a simple fracture; I have never seen bad effects follow its employment in this way. Where the wound is a clean cut and the edges can be brought together, this application should not be used. It forms part of the adhesive constituents of court plaster.

Benzoin is much used in pastilles, on account of its fragrance when burned.

Dose.—Benzoin and storax are seldom prescribed alone. The dose may be from gr. v to ʒss. Dose of the tincture, ♏xx to fʒj; it is difficult to combine this with water, and it can only be mixed easily by means of *treacle;* mucilage is of no use in aiding its diffusion through water.

BALSAM OF PERU, MYROXYLON PERUIFERUM (Decandria Monogynia; Leguminosæ).

Description. — This is a blackish-red liquid, having the consistence of treacle, and a fragrant balsamic odour.

BALSAM OF TOLU.

This is generally solid, and has a less powerful odour than Peruvian balsam, though equal to it in fragrance. Its powder has a yellow or reddish colour, but in the mass it is deep reddish-brown. It is obtained from the same plant as the last.

Methods of extraction. — *Balsams of Tolu and Peru* are both obtained by making incisions into the bark of the trees from which the balsam exudes. An inferior kind is said to be obtained by boiling the branches in water.

Properties. — Both Peruvian and Tolu balsams are entirely soluble in alcohol or ether, but the solution does not always remain clear. They both impart their acid ingredient to water, and their fragrancy is increased when thrown upon hot cinders.

Composition. — *A peculiar oil; resin;* and *cinnamomic acid.* The properties of the drugs are dependent upon each of these. The large proportion of resin and oil requires alcohol for their solution, and rectified spirit is accordingly ordered in the Pharmacopœia. The tincture becomes milky on the addition of water, owing to the precipitation of these principles; it ought to be triturated with *treacle* when its mixture with water is desired.

Medicinal properties. — *Stimulant; expectorant.* They act very beneficially upon foul and indolent ulcers, in promoting a healthy action; but for this purpose Peruvian balsam is the most valuable. They quicken the pulse, and increase feverishness if it is present. They act upon the mucous membranes, especially that of the lungs, and diminish excessive secretion. Tolu balsam is not quite so stimulating as Peruvian, and is more agreeable.

Uses. — They are used with nearly the same intentions and effects. They are very valuable in the *chronic bronchitis of old* people, attended with great mucous secretion, and the presence of slight feverishness does not always contra-indicate their employment in these cases; but they are not well suited to young people. Tolu is a common ingredient in cough lozenges, and is added to various pectoral mixtures, for the sake of its flavour. Peruvian balsam is beneficially applied locally, by means of lint soaked in it, to sphacelous and phagedenic ulcers, in India; it should be repeated night and morning (*Ainslie*). The same balsam mixed with ox-gall (ʒj to ʒiij) is recommended by Dr. A. T. Thomson, to be dropped into the ear, after syringing, to check fœtid discharges; and, mixed with simple cerate (ʒss to ℥j), it is in common use as an elegant salve for fissured lips or sore nipples. They both enter into the composition of fumigating pastilles.

MM. Trousseau and Pidoux speak very strongly of the efficacy of balsams, when inhaled, in the treatment of *chronic laryngitis,* in either the presence or absence of ulceration. They recommend a drachm or two of tolu or benzoin to be laid upon hot cinders, and the vapours thus diffused through the room are inhaled by the patient; or the same quantity may be added to boiling water, and the patient may inhale the vapour.

Dose. — Of the balsams, gr. x to ʒss, mixed with some absorbent powder, or suspended in water by means of *treacle* or yolk of egg. Of the tincture, ♏xx to fʒj, administered in a similar way.

TINCTURA BUCHU, *D. E.*

TINCTURE OF BUCHU.

Take of Buchu leaves, bruised, five ounces.
Proof spirit, two pints.

Macerate for fourteen (seven, *E.*) days; strain, express, and filter. (It may be made by percolation, *E.*)

Medicinal properties and uses. — See INFUSUM BUCHU, p. 344.
Dose. — ♏xxx.

TINCTURA CALUMBÆ, *L. D. E.*

TINCTURE OF CALUMBA.

Take of Calumba, thinly sliced, three ounces (℥v, *D.*).
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

E. This tincture is better made by percolation: the calumba being coarsely powdered, and soaked with a little spirit for six hours, before putting it into the percolator.

Medicinal properties and uses.—Aromatic; tonic; and stomachic.
Dose. — ♏xxx to fʒij. It may be combined with iron.

TINCTURA CAMPHORÆ, *D. E.*

TINCTURE OF CAMPHOR.

Synonyme. Spiritus Vini Camphoratus. Spiritus Camphoræ, *L.*

E. Take of Camphor, ℥ijss; Rectified spirit, Oij.
D. Camphor, ℥j; Rectified spirit, ℥viij.
Dissolve the camphor in the spirit.

Medicinal properties and uses.—See SPIRITUS CAMPHORÆ, p. 700.

CAMPHORA OFFICINARUM, LAURUS CAMPHORA (Enneandria Monogynia; Lauraceæ).

Description. — Camphor is a light, colourless solid; volatile at common temperatures, but again deposited on the side of the vessel removed from the light, in brilliant crystals. It has a peculiar odour, by which it may be instantly recognised. It is obtained in several ways. Sometimes large masses are found in the interior of the trees, on splitting them. Every part of the tree contains this substance; and by boiling the chopped roots and wood in water, the camphor sublimes, and is condensed upon straw in the head of the still; it is afterwards purified by re-sublimation with lime, in glass vessels.

Composition and chemical properties.— $C^{20}H^{16}O^{2}$. It is considered to be an oxide of a radical termed *camphogene*, $C^{10}H^{8}$ (*Dumas*). It burns with much smoke, but without becoming black. Nitric acid converts it into camphoric acid. It is very soluble in alcohol, ether, and oils; and is sufficiently soluble in water (gr. j in f℥j) to impart its odour and flavour to it; water impregnated with carbonic acid dissolves it in much larger quantities, and it may be readily suspended in this fluid by trituration with magnesia, sugar, gum, or yolk of egg. Milk dissolves one eighth of its weight of camphor by the aid of trituration, and does not deposit it on the addition of water; this is therefore a convenient and valuable way of administering it. It is not soluble in alkalies and their carbonates; but is dissolved by acids; which, however, with the exception of acetic acid, change its properties.

Artificial camphor is formed by the action of hydrochloric acid upon oil of turpentine, or some other volatile oil having the same constitution ($C^{20}H^{16}$). Its formula is $C^{20}H^{16}HCl$.

Medicinal properties.—*Acrid; narcotic and diaphoretic; stimulant?* It is liable to produce nausea or vomiting, if taken solid in large doses, and pain in the stomach and bowels, showing its acrid properties. Its action upon the circulation is much disputed. It sometimes raises the pulse and increases its frequency; but when the circulation is excited in fever, it reduces it, and at the same time renders the pulse softer. In two cases of poisoning by about a scruple of this drug, the pulse was so feeble as to be scarcely perceptible, and about 90 beats in the minute.* In another case, (ʒij taken,) it was 180 and small, pupils dilated, great general excitement, respiration difficult, and difficult and frequent micturition. In *moderate doses* it exhilarates, allays pain, and abates heat, causing diaphoresis. In *large doses* it causes giddiness, drowsiness, delirium or stupor, and convulsions; the pupil is sometimes natural, at other times dilated. These effects are sometimes followed by long continued depression. It is thought to prevent or lessen the strangury caused by cantharides, and it greatly promotes the action of senna when combined with it.† It also prevents squill from producing nausea, or irritating the bladder.

Characteristic effects.—Camphor is *distinguished* from *opium* by causing convulsions and delirium, with occasionally dilated pupil, and by its acrid effects upon the alimentary system: from *belladonna* and *hyoscyamus*, by not causing dilatation of the pupil constantly, and by causing diaphoresis; it also occasions headache, which is not usually produced by these two articles.

Uses.—There are no general rules for its internal administration. It is given in *low fever* accompanied with restlessness and subsultus tendinum; and vascular excitement and heat are allayed by it in such cases. It is used in many diseases of the nervous system, as in *mania*, in order to produce sleep; and in *hysteria*, *chorea*, and *asthma*, to allay the spasmodic affection. In *gout* and *rheumatism* it has been beneficially employed. In doses of two grains, combined with an equal weight of extract of hyoscyamus, and repeated every two hours, it is a favourite remedy with Dr. Bright for *dysmenorrhœa*. When used in inflammatory complaints, as *pneumonia*, &c., evacuants ought to be first employed. Mr. Denton has found it useful in checking the progress of *quinsy* in some cases in which the disease had frequently occurred.

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* Lancet, 1841-42, vols. i. and ii.

† Thomson, London Dispensatory.

A patient, being in extreme suffering, kept a small portion of solid camphor in the mouth, and in a few hours became free from pain, and the attack terminated without proceeding to suppuration, as it had done in previous instances. He now advises its employment in this way on the approach of the attack, and has seldom been disappointed in the results. It is a very unpleasant remedy, and many patients will not persevere with it long enough (six to twelve hours) to derive the full benefit from it. In *chordee* Mr. Milton has found it of great service in doses of *one tea-spoonful* of the tincture *every time the patient awakes with the pain.* In mild cases one dose each night generally suffices; but in severe ones the dose requires repetition for the first night or two. It sometimes causes sickness, but it should not be discontinued on that account; and he has observed this symptom as often after a small dose, as after the one above mentioned.* Camphor appears to possess considerable power as an antidote in cases of poisoning by strychnia. See p. 200.

Externally, it enters into several anodyne and stimulating liniments, and is employed in these forms to relieve rheumatic and muscular pains; and, when rubbed upon the abdomen, to remove flatulent colic. The aqueous solution (mistura camphoræ) is useful as a collyrium; and, when dissolved in oil, camphor is a soothing injection in *ardor urinæ*, *gonorrhœa*, and *tenesmus;* a scruple of powdered camphor sprinkled upon a common poultice, and applied to the perinæum, frequently relieves *chordee.* A pill of camphor and opium, or camphor dissolved in oil of turpentine, dropped into a carious tooth, often cures *toothache.* Nothing is more useful in allaying the intense itching of chilblains than the tincture of camphor; and it is also a most valuable application to severe bruises or sprains; if used immediately, and allowed to evaporate freely for 15 or 20 minutes, it relieves the pain exceedingly, and frequently prevents discolouration or subsequent bad consequences.

Antidotes.—An overdose is best relieved by opium, preceded by an emetic, if vomiting has not occurred. Coffee is injurious; wine is beneficial.

Dose and administration.—Camphor is not conveniently administered in the form of pills, as it is apt to cause nausea if taken solid in a pretty full dose; the camphor mixture does not produce this effect. It must be remembered that nearly the whole of the camphor is precipitated from the tincture on the addition of water. The solution in milk is a good form for its employment.

Dose.—Of the powder, gr j to gr. x; of the mixture, f℥j to f℥iij; of the tincture, ♏x to ♏xl. The other forms are used externally. Dr. Christison is of opinion that the doses usually prescribed are too small.

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* Ranking's Abst. vol xiv. p. 152.

TINCTURA CAMPHORÆ COMPOSITA, *L.*

COMPOUND TINCTURE OF CAMPHOR.

Synonyme. Paregoric Elixir, or simply Paregoric. Tinctura Opii Camphorata.

Take of Camphor, two scruples and a half.
Opium, powdered,
Benzoic acid, each, seventy-two grains.
Oil of anise, a fluid drachm.
Proof spirit, two pints.
Macerate for seven days, and strain.

Remarks.—Camphor has been thought to counteract the disagreeable excitant effect of opium, and is on this account combined with it in this preparation. The compound tincture is a stimulating anodyne, and is not adapted to cases in which we wish to obtain the sedative effects of opium; it is, however, a valuable sedative for the cough of chronic bronchitis, and is very extensively used for this purpose in Greenwich Hospital; the ordinary cough mixture in which place is—

Compound tincture of camphor, fʒij; Oxymel of squill, fʒvi. Taken almost *ad libitum.*

The addition of the benzoic acid and oil of aniseed communicates an agreeable flavour to the tincture, which, however, still tastes very strongly of camphor. One fluid ounce contains about two grains of opium.

Dose.—fʒss to fʒij.

TINCTURA CANNABIS INDICÆ, *D.*

TINCTURE OF INDIAN HEMP.

Take of Purified extract of Indian hemp, half an ounce.
Rectified spirit, half a pint.
Dissolve the extract in the spirit.

Medicinal properties and uses.—See EXTRACT. CANNABIS INDICÆ, p. 311.

Dose.—♏v to ♏xl.

TINCTURA CANTHARIDIS, *L. D. E.*

TINCTURE OF CANTHARIDES.

Take of Cantharides, bruised, four drachms.
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days; then express and strain.

E. If by percolation, the cantharides, coarsely powdered, must be left with a little of the spirit for twelve hours, in the state of pulp, before being put into the percolator.

Medicinal uses. — *Diuretic; stimulant.* It is useful in gleets, fluor albus, and incontinence of urine. It is likewise employed, externally, as a stimulating embrocation or rubefacient, in conjunction with camphor liniment, &c., in chronic rheumatism; and a rag soaked in this tincture is a useful application to frost-bitten parts, or to extremities affected with spontaneous gangrene.* In doses of ♏x increased to ♏xij three times a day, tincture of cantharides has been used internally in the treatment of *obstinate indolent ulcers.* In a few days a healing action commenced, and the ulcers were perfectly healed in a fortnight, after having resisted previous treatment for several months. Other remedial agents in the form of dressings, &c. were employed at the same time, but they had been used before without success.† It has been applied in baldness of the head as a stimulant.

Dose. — ♏x to ♏xxx, in some mucilaginous liquid.

TINCTURA CAPSICI, *L. D. E.*

TINCTURE OF CAPSICUM.

Take of Capsicum, bruised, ten drachms.
Proof spirit, two pints.

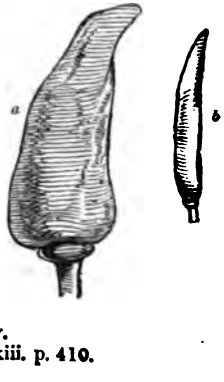
Macerate for seven (fourteen, *D.*) days, then express and strain.

D. Capsicum, ℥jss; Proof spirit, Oj.

E. Percolation may be commenced as soon as the capsicum is soaked with a little of the spirit.

Dose. — ♏x to fʒj.

CAPSICUM FASTIGIATUM (Pentandria Monogynia; Solanaceæ).



Description and varieties. — Capsicum pods are found in great variety of form and size, sometimes two or three inches long, and the form of *fig. a*; at other times, thin, flat, and about an inch long, *b*.

All agree in containing numerous hard, small seeds, enclosed in a thin, external pod which generally has a bright red colour, and smooth exterior.

Composition. — *Capsicin*, and an *aromatic bitter extractive. Capsicin* is an acrid, soft resin which is volatile when heated, and so acrid, that half a grain, volatilised in a large room, will cause every one present at the time to cough and sneeze.[*] It is slightly soluble in water, but is readily dissolved by spirit.

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* Thomson, London Dispensatory.

† Mr. Tait, Braith. Retros. vol. xxiii. p. 410.

Medicinal properties. — Capsicum is a powerful *acrid stimulant.* If chewed, in very small quantity, it causes great heat and burning in the mouth and throat, and warmth in the stomach. In excessive doses it has caused death with the symptoms of irritant poisoning.[†] In moderate doses it promotes the appetite and digestion in atonic dyspepsia. Its employment, as a condiment, causes perspiration in some persons, showing that it acts not only upon the mucous membranes, but upon the skin also. Applied to the skin it is rubefacient and vesicant.

Uses. — Chiefly as a *condiment.* It is very useful in the ulcerated throat of *cynanche maligna* and *scarlatina anginosa.* An attack of *common sore throat* without fever, in persons who are liable to it from slight causes, may often be relieved or prevented by using a gargle made with a tea-spoonful of Cayenne pepper, in six ounces of boiling water; or with f℥ij (*Christison*), f℥vi (*Pereira*), of the tincture, in eight ounces of cold water. In *sick headache*, which has not been relieved by the usual modes of treatment, I have seen the use of two grains of *freshly* powdered *capsicum pods*, repeated every hour, followed with very good effects.

Dose and administration. — Cayenne pepper, which is formed by drying and powdering capsicum berries, and is the officinal form of the drug, is given in doses of gr. v to gr. x, made into pills with confection of roses, or extract of gentian. This pepper is not nearly so pungent or efficacious as the freshly-powdered pods.

Of the tincture, properly diluted, the dose is ♏x to f℥j. It is sometimes added to oil of turpentine to prevent the nausea which this is apt to occasion. As a gargle it may be combined with nitric or hydrochloric acid, but not with solutions of metallic salts, which are incompatible with it.[‡]

TINCTURA CARDAMOMI, *E.*

TINCTURE OF CARDAMOMS.

Take of Cardamom seeds, bruised, four ounces and a half.
Proof spirit, two pints.
Macerate for seven days, squeeze, and strain.

If made by percolation, grind the seeds in a coffee-mill, and proceed as directed for Tincture of Capsicum.

ELETTARIA (*Alpinia*) CARDAMOMUM (Monandria Monogynia; Zingiberaceæ).

Description. — Cardamom is a small triangular fruit, which splits at its three angles, and allows the escape of the brown flattened seeds. It is about three quarters of an inch long, and one quarter broad. Its colour is pale yellow; and its odour aromatic, though slight. The flavour of the seeds is aromatic.

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[*] Paris, Pharmacologia.

[†] Pereira, Mat. Med. 2nd edit. p. 1258.

[‡] Med. Gaz. vol. xxiii.

Fruit for which it may be mistaken.—None.

Composition. — *Volatile oil*, $C^{10}H^{8}$, and *fixed oil*. The latter is reddened by hot nitric acid. The husk should never be used; as it does not contain any aromatic principle, and it absorbs a good deal of spirit.

Medicinal properties and uses.—*Aromatic*; for which property alone it is used. The tincture is added to bitter or purgative mixtures; but it is much less frequently employed than the compound tincture.

Dose.—fʒss to fʒij.

TINCTURA CARDAMOMI COMPOSITA, *L. D. E.*

COMPOUND TINCTURE OF CARDAMOM.

Take of Cardamoms,
Caraway,
Cochineal, each, bruised, two drachms and a half.
Cinnamon, bruised, five drachms.
Raisins (stoned), five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days, then express, and strain.

D. Cardamoms, Caraway, of each, ℥ss; Cinnamon, ℥j; Cochineal, ʒij; Proof spirit, Oiij.

E. Cardamoms, Caraway, of each, ʒijss; Cochineal, ʒj; Cinnamon, ʒv; Raisins, ℥v; Proof spirit, Oij.

For percolation, beat the solid materials together, moisten with a little spirit, and leave them for twelve hours before putting them into the percolator.

Medicinal properties and uses.—This is more aromatic and stimulant than the last, owing to the addition of the caraway and cinnamon. The cochineal and raisins also give it a fine red colour. On these accounts it is much more employed than the simple tincture. The uses and doses are the same.

TINCTURA CASCARILLÆ, *L. D. E.*

TINCTURE OF CASCARILLA.

Take of Cascarilla, bruised, five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days, then express and strain.

E. Proceed for maceration or percolation as ordered for Tinctura Cinchonæ.

Medicinal properties. — Aromatic; tonic; stomachic.

Dose.—fʒss to fʒij. (See INFUSUM CASCARILLÆ, p. 347.)

TINCTURA CASSIÆ, *E.*

TINCTURE OF CASSIA.

Take of Cassia, in moderately fine powder, three ounces and a half.
Proof spirit, two pints.

Digest for seven days; strain; express the residue strongly, and filter.

For percolation, let the powder macerate for twelve hours in a little spirit, before being put into the percolator.

Medicinal properties and uses.—The same as those of tincture of cinnamon, but not quite so delicate in flavour.

Dose.—♏xxx to fʒij.

TINCTURA CASTOREI, *L. E.*

TINCTURE OF CASTOR.

Take of Castor, bruised, two ounces and a half.
Rectified spirit, two pints.

Macerate for seven days, and then express and strain.

This tincture may be made by maceration or percolation, like Tincture of Cassia.

Properties and uses.— See CASTOREUM, p. 206.

Dose.—♏xx to fʒij.

TINCTURA CASTOREI AMMONIATA, *E.*

AMMONIATED TINCTURE OF CASTOR.

Take of Castor, bruised, two ounces and a half.
Assafœtida, in small fragments, ten drachms.
Spirit of ammonia, two pints.

Digest for seven days; strain; express strongly the residuum, and filter. It cannot be well made by percolation.

Medicinal properties and uses. — The same, in the main, as those of tincture of castor; but the assafœtida and ammonia render it more powerfully antispasmodic in hysteria.

Dose. — ♏xxx to fʒj.

seeds. It is about three quarters of an inch long, and one quarter broad. Its colour is pale yellow; and its odour aromatic, though slight. The flavour of the seeds is aromatic.

Fruit for which it may be mistaken.—None.

Composition.—*Volatile oil*, $C^{10}H^{8}$, and *fixed oil*. The latter is reddened by hot nitric acid. The husk should never be used; as it does not contain any aromatic principle, and it absorbs a good deal of spirit.

Medicinal properties and uses.—*Aromatic;* for which property alone it is used. The tincture is added to bitter or purgative mixtures; but it is much less frequently employed than the compound tincture.

Dose.—fʒss to fʒij.

TINCTURA CARDAMOMI COMPOSITA, *L. D. E.*

COMPOUND TINCTURE OF CARDAMOM.

Take of Cardamoms,
Caraway,
Cochineal, each, bruised, two drachms and a half.
Cinnamon, bruised, five drachms.
Raisins (stoned), five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days, then express, and strain.

D. Cardamoms, Caraway, of each, ℥ss; Cinnamon, ℥j; Cochineal, ʒij; Proof spirit, Oiij.

E. Cardamoms, Caraway, of each, ʒijss; Cochineal, ʒj; Cinnamon, ʒv; Raisins, ℥v; Proof spirit, Oij.

For percolation, beat the solid materials together, moisten with a little spirit, and leave them for twelve hours before putting them into the percolator.

Medicinal properties and uses.—This is more aromatic and stimulant than the last, owing to the addition of the caraway and cinnamon. The cochineal and raisins also give it a fine red colour. On these accounts it is much more employed than the simple tincture. The uses and doses are the same.

TINCTURA CASCARILLÆ, *L. D. E.*

TINCTURE OF CASCARILLA.

Take of Cascarilla, bruised, five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days, then express and strain.

E. Proceed for maceration or percolation as ordered for Tinctura Cinchonæ.

Medicinal properties. — Aromatic; tonic; stomachic.

Dose.—f℥ss to f℥ij. (See Infusum Cascarillæ, p. 347.)

TINCTURA CASSIÆ, *E.*

Tincture of Cassia.

Take of Cassia, in moderately fine powder, three ounces and a half.
Proof spirit, two pints.

Digest for seven days; strain; express the residue strongly, and filter.

For percolation, let the powder macerate for twelve hours in a little spirit, before being put into the percolator.

Medicinal properties and uses.—The same as those of tincture of cinnamon, but not quite so delicate in flavour.

Dose.—♏xxx to f℥ij.

TINCTURA CASTOREI, *L. E.*

Tincture of Castor.

Take of Castor, bruised, two ounces and a half.
Rectified spirit, two pints.

Macerate for seven days, and then express and strain.

This tincture may be made by maceration or percolation, like Tincture of Cassia.

Properties and uses.— See Castoreum, p. 206.

Dose.—♏xx to f℥ij.

TINCTURA CASTOREI AMMONIATA, *E.*

Ammoniated Tincture of Castor.

Take of Castor, bruised, two ounces and a half.
Assafœtida, in small fragments, ten drachms.
Spirit of ammonia, two pints.

Digest for seven days; strain; express strongly the residuum, and filter. It cannot be well made by percolation.

Medicinal properties and uses. — The same, in the main, as those of tincture of castor; but the assafœtida and ammonia render it more powerfully antispasmodic in hysteria.

Dose. — ♏xxx to f℥j.

TINCTURA CATECHU COMPOSITA, *L.D.E.*

TINCTURE OF CATECHU.

Take of Catechu, coarsely powdered, three ounces and a half (℥iv, *D.*).
Cinnamon, bruised (finely, *E.*), two ounces and a half (℥ij, *D.*).
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

E. For percolation, the mixed powders must be put into the percolator, without being previously moistened with the spirit.

ACACIA CATECHU (Polygamia Monœcia; Mimoseæ).

Description and varieties.—Catechu, or, as it is also termed, Cutch, or terra Japonica, occurs in many forms. It is frequently seen in small cubical masses, about two inches square, of a yellow or brown colour; sometimes in small, flat, round cakes; and at others, in irregular lumps, in which no distinct form can be traced. It used also to occur frequently in balls weighing ℥ij or ℥iv. Its colour varies from a very pale brown, almost white, to a dark almost black, brown. It is obtained from the Acacia catechu by boiling the chips of the inner wood in water, and evaporating the extract to a proper consistence, after which it is poured into moulds. It is also obtained from the nuts of the Areca catechu or catechu palm, by a similar process; and from the Uncaria gambir, by boiling the leaves and evaporating the extract.

Substances for which it may be mistaken.—The dark, irregular pieces of catechu may be mistaken for aloes, from which it is distinguished by the absence of smell, when breathed upon, and by the difference of flavour when chewed.

Composition.—Catechu consists principally of tannic acid, and of a peculiar principle called catechine, or catechinic acid, which imparts a sweetish taste to the catechu. The tannic acid is soluble in cold water, but not the catechine, for which alcohol is the proper menstruum: hence proof spirit, which dissolves both, is ordered for the tincture.

Medicinal properties.—Purely and powerfully *astringent.* It is more powerful than kino.

Uses.—It is used in *chronic mucous discharges* and *passive hæmorrhages;* especially from the bowels. In *diarrhœa* it is an almost constant addition to the mistura cretæ. In *profuse menstruation,* Dr. Babington frequently used it, combined with confectio opii. In relaxed uvula, and the slight sore throat so common in clergymen and public singers or speakers, it is very useful when held in the mouth and gradually sucked. Lozenges are made for this purpose. It is employed as a tooth powder to relieve spongy gums, "particularly when these are consequent upon the use of mercury as a sialogogue."* It is also sometimes used with benefit to check *profuse sweating* dependent upon debility. It has been highly commended as a local application to chapped or sloughing nipples†; but it as frequently fails in this troublesome affection as any other remedy.

Incompatibles. — Salts of iron. Preparations of vegetable alkaloids, such as opium, cinchona, &c., are in some degree incompatible; but the compounds which they form with the tannin, though insoluble in water, are perhaps sufficiently soluble in the gastric juices; indeed catechu is daily combined with tincture of opium, with the best effects.

Dose. — Of the powder, in the form of bolus or lozenge, gr. x to ʒj; of the tincture, ♏xx to fʒij.

TINCTURA CHIRETTÆ, *D*

TINCTURE OF CHIRETTA.

Take of Chiretta, bruised, five ounces.
Proof spirit, two pints.
Macerate for fourteen days; strain, express, and filter.

Medicinal properties and uses. — See INFUSUM CHIRETTÆ, p. 348.

Dose. — ♏xxx to fʒj.

TINCTURA CINCHONÆ, *L. D. E.*

TINCTURE OF CINCHONA.

Synonyme. Tincture of Bark.

Take of Yellow (crown, or pale, *D.*) cinchona, bruised, eight ounces.
Proof spirit, two pints.
Macerate for seven days; then express and strain.

E. Yellow bark, or any other kind, if prescribed, in fine powder, ℥viij; Proof spirit, Oij. Percolate the bark with the spirit; the bark being previously moistened with a very little spirit, left thus for ten or twelve hours, and then firmly packed into the percolator. If made by digestion, the bark should be only coarsely powdered.

Medicinal uses. — *Tonic; stomachic.*

Dose. — fʒss to fʒij. It is principally used in mixtures with the infusion or decoction of cinchona, as it contains so small a quantity of bark compared with the spirit, that it would be too stimulant for administration by itself in ague.

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* Christison's Dispensatory.

† Lancet, vol. i. 1841-42.

TINCTURA CINCHONÆ COMPOSITA, *L. D. E.*

COMPOUND TINCTURE OF CINCHONA.

Synonyme. Huxham's Tincture of Bark.

Take of Pale (yellow, *E.*) cinchona, coarsely powdered, four ounces.
Orange peel (bitter, *D. E.*), dried, three ounces (℥ij, *D.*).
Serpentary, bruised, six drachms.
Saffron, two drachms.
Cochineal, powdered, a drachm.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

E. May be made by percolation, like compound tincture of cardamoms; the cinchona and serpentary being in moderately fine powder.

Medicinal properties.—Tonic; stomachic.

Dose.—f℥j to f℥iij. It contains considerably less cinchona than the simple tincture, but is rendered more grateful by the admixture of the bitters and aromatics.

TINCTURA CINCHONÆ PALLIDÆ, *L.*

TINCTURE OF PALE BARK.

Prepare this in the same way as Tincture of Cinchona, p. 743.

Medicinal properties, uses, and doses.—The same as those of Tinctura Cinchonæ.

TINCTURA CINNAMOMI, *L. E.*

TINCTURE OF CINNAMON.

Take of Cinnamon, bruised, three ounces and a half.
Proof spirit, two pints.

Macerate for seven days, and strain.

E. Proceed by percolation or digestion, as directed for Tinctura Cassiæ.

Medicinal uses.—See TINCTURA CINNAMOMI COMPOSITA, p. 745.

TINCTURA CINNAMOMI COMPOSITA, *L.D.E.*

COMPOUND TINCTURE OF CINNAMON.

Synonyme. Tinctura Aromatica.

Take of Cinnamon, bruised, an ounce.
Cardamoms, bruised, half an ounce.
Long pepper, powdered,
Ginger, bruised, each, two drachms and a half.
Proof spirit, two pints.
Macerate for seven days; then express and strain.

D. Cinnamon, ℥ij; Cardamoms, ℥j; Ginger, ℥ss; Proof spirit, Oij. Macerate fourteen days.

E. Cinnamon, cardamom seeds, coarsely powdered, of each, ℥j; Long pepper, ground finely, ʒiij; Proof spirit, Oij. Digest seven days; or percolate as directed for the Compound Tincture of Cardamoms.

Medicinal properties and uses.—Stimulant; aromatic; and *astringent.* Incompatible with salts of iron.

Dose. — ♏xxx to fʒij.

TINCTURA COCCI CACTI, *D.*

TINCTURE OF COCHINEAL.

Take of Cochineal, in fine powder, two ounces.
Proof spirit, one pint.
Macerate for fourteen days; strain, express, and filter.

Uses. — Merely for the sake of its fine red colour.

TINCTURA (SEMINUM, *D.*) COLCHICI, *L.E.*

TINCTURE OF MEADOW SAFFRON.

Take of Meadow saffron seeds, bruised, five ounces.
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days; then express and strain.

E. This tincture is much better made by percolation, like Tincture of Cinchona.

Remarks. — Dr. A. T. Thomson says that the seeds should not be crushed, as the active principle resides in the husk. If, however, the whole of the bruised seeds be employed, they will not have sustained any loss from the bruising.

Medicinal uses. — See ACETUM COLCHICI, p. 67.

Dose. — ♏xx to fʒij.

TINCTURA COLCHICI COMPOSITA, *L.*

COMPOUND TINCTURE OF MEADOW SAFFRON.

Take of Meadow saffron seeds, bruised, five ounces.
Aromatic spirit of ammonia, two pints.
Macerate for seven days; then express and strain.

Remarks.—This preparation is said to be of greater value than the simple tincture where acidity or flatulence prevails (*Williams*). It is doubtful whether the ammonia may not interfere with the solubility of the colchicina. It is beneficially employed in the rheumatism of debilitated and aged persons, and those who have indulged in the free use of stimulants.

Dose.—♏xx to fʒij.

TINCTURA CONII, *L. E.*

TINCTURE OF HEMLOCK.

Take of Hemlock (leaves), dried, five ounces.
Proof spirit, two pints.
Macerate for seven days; then express and strain.

E. Conium leaves, *fresh*, ℥xii; Tincture of cardamom, Oss; Rectified spirit, Ojss. Bruise the hemlock leaves, and express the juice strongly; bruise the residuum and pack it firmly in a percolator; transmit first the tincture of cardamom, and then the rectified spirit, allowing the spirituous liquors to mix with the expressed juice, as they pass through; add gently, water enough to the percolator for pushing through the spirit remaining in the residuum. Filter the liquor after agitation.

Remarks.—The Edinburgh tincture being prepared from fresh leaves instead of dried ones, as directed in the Ph. L., is supposed to contain more of the active principles of the hemlock.

Medicinal properties.—See EXTRACTUM CONII, p. 320.

Uses.—It may be used in most of the cases requiring conium, and is very strongly recommended by Sir C. Scudamore in phthysis. He advises the following formula:—

℞ Iodinii, et potassii iodidi, āā. gr. vi.
Spiritus rectificati, fʒij.
Aquæ, f℥vi. M.

The dose is fʒj to f℥ss of this mixture, mixed with a pint or a quart of water kept about the temperature of 120° F., to which is to be added, at the time of using it, fʒss or fʒj of the tincture of conium.

For some interesting particulars respecting this plan of treatment, I must refer the reader to his original paper in the Med.

Gaz. for Feb. 1840, p. 756., or to the reprint of it in the 1st vol. of Braithwaite's Retrospect.

TINCTURA CROCI, *D. E.*

TINCTURE OF SAFFRON.

D. Take of Saffron, chopped fine, ℥ij; Proof spirit, Oj.
E. Saffron, ℥ij; Proof spirit, Oij.
Macerate seven (*E.*), fourteen (*D.*), days; express, filter, and strain: or,
E. Percolate, as directed for Tinctura Cinchonæ.
Uses.—Only as a colouring agent.

TINCTURA CUBEBÆ, *L. D.*

TINCTURE OF CUBEB.

Take of Cubebs, bruised, one pound (℥v, *D.*).
Proof (rectified, *D.*) spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

Medicinal uses.—See OLEA DESTILLATA, OLEUM CUBEBÆ, p. 640. Taken internally in cases of gonorrhœa.

Dose.—fʒjss to fʒij.

The present tincture is made with proof instead of rectified spirit, as formerly, and it is also above twice as strong.

TINCTURA CUSPARIÆ, *E.*

TINCTURE OF CUSPARIA.

Take of Cusparia, in moderately fine powder, four ounces and a half.
Proof spirit, two pints.

Macerate, or percolate as ordered for Tincture of Cinchona.

Medicinal properties and uses.—See INFUSUM CUSPARIÆ, p. 350.

Dose.—♏xxx to fʒj.

TINCTURA DIGITALIS, *L. D. E.*

TINCTURE OF FOXGLOVE.

Take of Foxglove (leaves), dried, four ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

D. Foxglove, ℥v; Proof spirit, Oij.

E. Percolate as in Tincture of Capsicum, or make it by digestion.

Medicinal properties and uses.—See Infusum Digitalis, p. 353. This tincture may be given advantageously with tinctura ferri muriatis, though the mixture becomes almost black.

Dose.—♏xv to fʒj. It has been given to the extent of f℥ss. (See p. 354.)

TINCTURA ERGOTÆ, *D.*

Tincture of Ergot.

Take of Ergot of rye, in coarse powder, eight ounces.
Proof spirit, two pints.
Macerate for fourteen days; strain, express, and filter.

Properties and uses. — See the next preparation.

Dose — ♏xv to fʒij, according to the object in view.

TINCTURA ERGOTÆ ÆTHEREA.

Ethereal Tincture of Ergot.

Take of Ergot, powdered, fifteen ounces.
Ether, two pints.
Macerate for seven days; then express and strain.

Medicinal properties and uses. — See Ergot, below.

Dose. — ♏xv, every three or four hours, if given to suppress chronic hæmorrhage; ♏xxx to fʒj every half hour for two or three doses, if given to excite uterine action, or to check sudden hæmorrhage from want of contraction in that organ.

ERGOTA, Secale Cereale. (Degenerated seed, from a parasitical fungus?)

Synonyme. Secale Cornutum. Spurred Rye.

Botany. — Great difference of opinion has existed as to the nature of this production, but the recent researches of Mr. Queckett, as well as those of several other observers, seem to have proved that it is a diseased and altered condition of the ovarium or fruit which is occasioned by the presence, in the early stage of its development, of a number of minute sporidia of a fungus, termed by Mr. Queckett, Ergotætia abortifaciens. When these, in a moistened state, come in contact with any kind of gramineous plant, they cause a degeneration resembling that of the ergot of rye, but it is principally on this plant that its development has been carefully noticed. At first, the ovarium and its appendages are covered with a white coating of sporidia mixed with delicate filaments, and the whole is glued together with a gummy secretion; the ovarium increases in size, but instead of being matured into a healthy grain, it assumes a purple colour, becomes much larger than natural, is solid, and changed in its structure, contains no embryo, but shows its origin by a small tuft upon the summit of the ergot, which is asserted to be the remains of the changed stigmata and pericarp.

Description. — Ergot is generally in violet-coloured grains, about an inch long, and curved, so as to resemble a cock's spur, from which it derives its name of "spurred rye." It is obtusely rounded at the ends, one of which is often sharper than the other. It is marked longitudinally by three deep grooves, showing the natural division of the ovarium into three cells. When dry, it is hard and tough, and is powdered with difficulty; but, if in a moist air, it becomes damp, and is quickly infested with myriads of small brown insects, which eat the whole of the interior and leave only the hard violet-coloured shell, which either remains firm or crumbles of itself. The smell of powdered ergot is peculiar and slightly nauseous; and the taste is somewhat sickly, though slight. It is said that if a small proportion of camphor is mixed with powdered ergot, it completely prevents the ravages of the acari which destroy the ergot; but this plan often fails. It is of the first importance that the secale should be *freshly* powdered, in order to obtain satisfactory effects from its administration.

Composition. — Secale contains a peculiar oil, which is soluble in ether and alcohol, and appears to possess the peculiar medicinal properties of the drug; and ergotin, an acrid solid substance, soluble in ether and alcohol, but insoluble in water; this is poisonous, but does not, when isolated, produce uterine contractions. It contains also a number of vegetable principles, which are inactive when isolated. It contains a small quantity of tannin.

Chemical properties. — Ergot yields its active principles to hot water, to alcohol, and to ether; and preparations by each of these menstrua are in daily use. It is seldom prescribed in combination, but it causes a precipitate with the salts of lead.

Drugs for which secale may be mistaken. — None.

Medicinal properties. — By far the most important property of ergot is its power of increasing uterine contraction; it is capable, also, of exciting it into action, when previously quiescent, but this effect is much less uniform and certain than the increase produced when it is acting, however slightly, to begin with.

The kind of uterine contraction occasioned by it, differs materially from what is natural, for whilst this is intermittent, that excited by the ergot is unintermitting, and more nearly resembles constant griping; when administered during the progress of labour, a few minutes elapse (ten to twenty) before any effect is produced, and the first evidence of its action is often a single fit of severe vomiting; this does not in any degree interfere with its peculiar influence over the uterus, and is often favourable rather than otherwise, for as soon as the vomiting commences the vagina becomes copiously lubricated with mucus, though it may have been previously dry and harsh; and the uterine action is as powerfully excited as if the drug had been retained in the stomach; this influence continues until the whole contents of the uterus have been expelled, and causes the firm contraction of that organ after the expulsion of the placenta. A property has been assigned to the ergot, viz. that of causing the death of the fœtus; and it is said that this opinion is founded not only upon the number of children still-born after the administration of the drug, but upon the symptoms evinced by those which recover. Thus, Dr. Ramsbotham [*] states that twenty-one children out of thirty-six were born alive, when premature labour was induced by mechanical means; whilst only twelve out of twenty-six were born alive when ergot was used. This gives a mortality of 11 per cent. against the ergot. Dr. Beatty [†] says that some of the children which were born alive or were restored from temporary stillness, had convulsions and other symptoms of ergotism; and this effect has been noticed by other writers. It must be borne in mind that ergot is not administered by prudent practitioners, unless there is some unusual delay in the case, or there is such an amount of obstruction as is capable of being overcome by the assisted power of the uterus, though, if unaided, there would be a necessity for the use of artificial means of delivery; and these are just the cases in which the children would probably be still-born if the remedy had not been administered at all. That the experience of the profession is against the frequent occurrence of these injurious effects to the child, is proved by the continued employment of the secale by the great bulk of midwifery practitioners, who are men of caution and observation. An extensive opportunity for observation in the Dublin Lying-in Hospital, and in other practice, has scarcely confirmed in my mind the fears entertained by some writers on this subject. Dr. Beatty is of opinion that this effect is not produced unless the birth of the child is delayed two hours after the administration of the ergot.[‡]

Ergotism.—Secale sometimes produces headache, giddiness, delirium, or convulsions; but it is *very* rare for these effects to be noticed in lying-in women.

In some countries, when all the grain has been spurred, as happens in particular seasons, remarkable effects have been produced upon the health by the use of this diseased article of food. These appear in two distinct forms; in one of which, convulsions and speedy death form the prominent features; whilst in the other, the sufferer loses flesh, feels as if covered with innumerable insects, has a voracious appetite, and acute pain in the limbs, which soon terminates in mortification of the extremities, from which recovery takes place by spontaneous separation of the dead parts, if death does not occur before this can be effected.

Uses.—The most important and, until lately, the only use of the secale was for *promoting uterine contraction.* The rules laid down by obstetric writers on this subject are, that it must not be administered if the uterine action is proceeding regularly, nor until the os uteri is fully or very nearly dilated, even if the contractions are failing. It is generally said, that if the vagina is dry it should not be given; but I have observed several cases in which one of the first effects was a copious secretion of mucus from a previously dry vagina, preceded in some cases by vomiting. It is also a general rule that it must not be given if there is more than a slight deformity of the pelvis, or unusual organic obstruction to the birth of the child, as rupture of the uterus has been occasioned in such cases, by the powerful contractions excited by the drug.

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[*] Med. Gaz. June 15. 1839.

[†] Dub. Jour. Med. Science, May, 1844, p. 218.

[‡] Ibid.

Uterine hæmorrhage is more effectually controlled or prevented by this medicine than by any other; and this is the case, whether it occurs before or after the birth of the child or placenta. *In every case in which there has previously been hæmorrhage after delivery, a dose of secale should be given as soon as the os uteri is fully dilated, and the progress of the labour warrants it; and this without waiting for any diminution of the uterine contraction.* The labour proceeds more quickly, and instead of the hæmorrhage which has been anticipated, the uterus continues to contract and soon expels the placenta, and then remains firmly contracted. If there is any delay in the expulsion of the placenta, another dose should be given as soon as the child is born.

In the treatment of *abortions*, advantage is also derived from the use of secale in the same way. It promotes the expulsion of the ovum, and lessens the hæmorrhage, which is often severe. It is sometimes used to procure abortion, but it cannot be *relied* on for this purpose, unless there has been some previous uterine action. It is, however, well established, that in many cases it does excite contractions *de novo;* and it is strongly advised by Rigby, that repeated doses should be given in attempting to produce premature delivery, even in those cases in which puncturing the membranes is ultimately necessary.

From its influence upon uterine hæmorrhage connected with pregnancy, it has been supposed that secale might be equally useful in the treatment of menorrhagia, and it has accordingly been used in this disease. In the cases which have fallen under my own observation, it has not proved worthy of much confidence; and though it is generally mentioned by systematic writers, they do not bestow as much commendation upon it as upon the other remedies employed for this disease. It has also been used, with variable success, in the treatment of hæmorrhages from the mucous membranes of the nose and alimentary canal.

Several cases of paraplegia are reported, in which the use of ergot has been followed by recovery or improvement; but it is difficult to account for this effect from the known actions of secale, and the causes of paraplegia are so numerous and obscure, that it is difficult to know how far improvement is really owing to the remedy employed. Dr. Williams, of St. Thomas's Hospital, has found it useful in paralysis from lead, when given in doses of ten grains, three times daily.[*]

Several cases of *retention of urine*, occurring principally, but not exclusively, in old men, and expressly stated to have been unconnected with stricture of the urethra, have also been reported; and it is impossible to read the details of the cases without attributing the recovery of the expulsive power of the bladder to the effects of the secale. In all the cases the catheter had been requisite for some time, and various modes of treatment had been unsuccessfully employed. The urine is sometimes said to have been clear, sometimes muddy. The doses varied from 10, 20, or 30 grains every morning to gr. v or gr. vi, two or three times a day.[*]

Dose and administration. — Secale is given in every form, from the simple powder, diffused in cold water, to an ethereal tincture. It answers equally well, whether simply mixed with cold water, or prepared, like tea, with hot water and a little milk, or when made into an alcoholic or ethereal tincture.

The dose is generally from ℈j to ʒss. If given in the latter dose, it very seldom fails to act in ten or twenty minutes, and seldom requires repetition. In the smaller quantity, a second dose is often needed. The dose of the ethereal tincture is ♏xx or ♏xxx to f℥j, on sugar or in water. Some practitioners give ʒj to ʒiij of the powder at a time; a quantity which is perfectly unnecessary, though I have not heard of its producing injurious consequences. These large doses do not operate more quickly or certainly than the smaller ones.

TINCTURA FERRI ACETATIS, *D.*

TINCTURE OF ACETATE OF IRON. See METALLICA, TINCT. FERRI ACETATIS, p. 469.

TINCTURA FERRI SESQUICHLORIDI, *L. D. E.*

TINCTURE OF SESQUICHLORIDE OF IRON. See METALLICA, TINCT. FERRI SESQUICHLORIDI, p. 465.

Synonyme. Tinctura Ferri Muriatis.

TINCTURA GALLÆ (GALLARUM, *E.*) *L. D. E.*

TINCTURE OF GALLS.

Take of Powdered gall, five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

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[*] Lancet, 1842-43, vol. i. p. 618.

[†] Braith. Retros. vol. ix. p. 87.

E. This tincture may be prepared either by digestion or percolation as directed for Tincture of Capsicum.

Medicinal properties.—*Astringent.*

Uses.—Galls are not often prescribed internally, and the *unguentum gallæ comp.* is the only officinal preparation for external use. In the Dublin Lying-in Hospital, a very useful astringent pessary is employed in some severe cases of prolapsus uteri, consisting of powdered galls, powdered oak bark, and alum, mixed together and enclosed in a muslin bag, which is introduced into the vagina, and retained there.

The tincture is chiefly employed as a test for the detection of salts of iron. It is sometimes added to gargles in relaxation of the uvula, or to injections for gleet or leucorrhœa. An infusion of ʒiv of galls to f℥vi of water is recommended in cases of poisoning by vegetable alkaloids, and in some chronic alvine discharges. Dr. Charvet says that pure tannin, in doses of gr. ss to gr. jss, is valuable in checking the sweating of phthysis, and it does not cause discomfort to the patient.*

Doses.—Of the tincture, as an astringent, fʒss to fʒij; of the infusion, f℥ss to f℥ij; or, in cases of poisoning, f℥iv.

Incompatibles.—Most metallic salts.

QUERCUS INFECTORIA (Monœcia Polyandria; Cupuliferæ).

Description and varieties.—The Quercus infectoria, which produces the galls, is a small tree, only four or six feet high. A little insect (Cynips gallæ tinctoriæ) punctures the ends of the branches and shoots of the tree, and lays her eggs in the wound; an excrescence (the nutgall) is soon formed around it, within which the eggs are converted by progressive development into the larva, chrysalis, and perfect insect or imago; as soon as this is formed, it eats its way out, and causes the hole which may frequently be seen passing into the centre of the nutgall.

The best galls come from Aleppo; some are brought from the East Indies. There are two kinds: the *black* or *blue*, and the *white* galls. The first are the most valuable, as they contain the most astringency; they are dark coloured, heavy, rough, and seldom pierced by a hole, as they are gathered before the perfect insect is developed. The white galls have a pale yellowish colour, are larger, lighter, smoother, and have far less astringency: they are generally pierced by a hole, and are much less valuable.

Composition.—Galls yield about 35 per cent. of tannic and gallic acids, but it is probable that little or no gallic acid naturally exists in them. When moist tannic acid is exposed to the air, as in making an infusion, or filtering a solution, it absorbs oxygen from the atmosphere, gives off carbonic acid and water, and is converted into gallic acid. Thus:—

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* Med. Gaz. vol. xxvii. p. 382.

	C.	H.	O.			C.	H.	O.
1 eq. tannic acid	18	8	12	=	2 eqs. gallic acid	14	6	10
8 eqs. oxygen from the air	0	0	8		4 eqs. carbonic acid	4	0	8
					2 eqs. water	0	2	2
	18	8	20			18	8	20

Tests. — Both gallic and tannic acids possess the property of astringency in a high degree; and both cause a deep blue colour, with the persalts of iron. Gallic acid, however, does not form a precipitate with a solution of isinglass or gelatine, and by this property it is distinguished from tannic acid, which does cause a precipitate with solution of gelatine.

TINCTURA GENTIANÆ COMPOSITA, *L. D. E.*

COMPOUND TINCTURE OF GENTIAN.

Synonyme. Tinctura Amara.

Take of Gentian, sliced, two ounces and a half.
(Bitter) orange peel, dried, ten drachms.
Cardamoms, bruised, five drachms.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

D. Gentian, ℥iij; Bitter orange peel, dried, ℥jss; Cardamoms, ℥ss; Proof spirit, Oij.

E. Gentian, ℥ijss; Bitter orange peel, dried, ʒx; Canella, ʒvi; Cochineal, ʒss; Proof spirit, Oij. Digest for seven days; or percolate as directed for Compound Tincture of Cardamom.

Medicinal properties and uses. — *Tonic* and *stomachic.*

Dose. — ♏xxx to fʒij, or ℥ss. It is generally added to some bitter infusion.

TINCTURA GUAIACI, *L. E.*

TINCTURE OF GUAIACUM.

Take of Guaiacum resin, in fine powder, eight ounces.
Rectified spirit, two pints.

Macerate for fourteen (seven, *E.*) days; strain, express, and filter.

E. Guaiac in coarse powder, ℥vij; Rectified spirit, Oij.

Medicinal uses.—*Stimulant; diaphoretic.*

Dose.—fʒj to fʒiij.

When mixed with water, the guaiacum is precipitated; it should therefore be exhibited in mixture with some treacle, or with yolk of egg. Mucilage is coagulated by the spirit.

TINCTURA GUAIACI AMMONIATA, *E.*

Take of Guaiac in coarse powder, seven ounces.
Spirit of ammonia, two pints.
Digest seven days.

TINCTURA GUAIACI COMPOSITA, *L.*

COMPOUND TINCTURE OF GUAIACUM.

Take of Guaiacum resin, coarsely powdered, seven ounces.
Aromatic spirit of ammonia, two pints.
Macerate for seven days, and strain.

Medicinal uses.—*Stimulant; diaphoretic.*

Dose.—fʒss to fʒj. This is a more powerful preparation than the simple tincture, on account of the presence of ammonia. Like the simple tincture, it is decomposed by water, and must therefore be exhibited with similar precautions.

When mixed with an equal quantity of spirit of nitric ether, it is a useful remedy for chronic rheumatism in old persons. It may be taken in tea, in doses of ʒj, three or four times a day.

TINCTURA HELLEBORI, *L.*

TINCTURE OF HELLEBORE.

Synonyme. Tinctura Melampodii. Tinctura Hellebori Nigri.

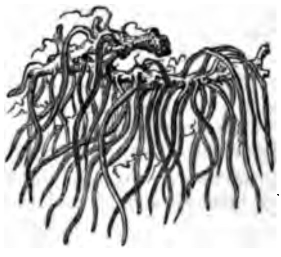
Take of Hellebore, bruised, five ounces.
Proof spirit, two pints.
Macerate for seven days; then express and strain.

Dose.—fʒss to fʒj.

HELLEBORUS NIGER (Polyandria Polygynia; Ranunculaceæ).

Description.—Black hellebore root is in black irregular knotty pieces, from one to several inches long, and about the thickness of the finger. A number of straight, black, unbranched root fibres proceed from it.

Roots for which it is liable to be mistaken.—Senega and tormentilla.



It is distinguished from both by its straight, black, rigid root fibres, and general black colour.

Composition.—Very *acrid oil*, *volatile oil*, and a *volatile acid.*

Medicinal effects. — *Drastic cathartic; irritant narcotic; anthelmintic; emmenagogue.* In *large* doses it causes violent purging, sometimes sickness, convulsions, paralysis, and insensibility. In *moderate* doses it purges, and excites the pelvic and portal circulations. Applied to the skin, it causes rubefaction. It ought never to be given if there is inflammation of the bowels.

Characteristic effects. —Drastic purgative, combined with a narcotic effect. It is irregular in its action, and causes much griping. Besides its purging properties, it is emmenagogue, and promotes the biliary secretion.

Uses.—In *mania* and *melancholia*, hellebore has been used from the time of Celsus. In *dropsy*, dependent upon languid or disordered portal circulation. As an emmenagogue it was highly esteemed by Mead, and it is sometimes taken to cause abortion. It has been given as an anthelmintic, but there are many which are much better. In *chronic* skin diseases, as lepra, it has been used.

Dose.—Of the tincture, f℥ss to f℥ij. It is chiefly used as an emmenagogue in leucophlegmatic habits.

TINCTURA HYOSCYAMI, *L. D. E.*

TINCTURE OF HENBANE.

Take of Hyoscyamus, dried, small (in moderately fine
powder, *D. E.*), five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

E. Percolate as directed for Tincture of Capsicum.

Medicinal properties and uses. — *Narcotic.* Dose ♏xv to f℥j. It procures sleep without affecting the head, or producing the costiveness which opium is apt to do. (See EXTRACTUM HYOSCYAMI, p. 327.)

TINCTURA IODINII, *E.*

TINCTURE OF IODINE.

Take of Iodine, two ounces and a half.
Rectified spirit, two pints.

Dissolve the iodine in the spirit with the aid of a gentle heat and agitation. Keep the tincture in a well stopped bottle.

Medicinal properties and uses. — This tincture is so horrible in its taste that it is seldom used internally. Externally, it is a valuable counter-irritant in chronic ophthalmia, when painted round the orbit; and also in the incipient hip disease of children, when painted behind the trochanter.

Dose. — ♏xv contain nearly gr. j of iodine, from which the dose must be calculated.

TINCTURA IODINII COMPOSITA, *L.D.*

Compound Tincture of Iodine.

Take of Iodine, an ounce.
Iodide of potassium, two ounces.
Rectified spirit, two pints.
Macerate until they are dissolved, and strain.

Remarks. — The iodide of potassium renders the iodine more soluble, and is here employed for this purpose, as well as to increase the strength of the solution. It is thought that the uncombined iodine renders the medicine more efficacious, though it makes it very unpalatable. Both the iodine and iodide of potassium ought to be perfectly soluble, and the filtration is therefore unnecessary.

Medicinal uses. — See Potassii Iodidum, p. 577.

Dose. — ♏x to fʒj. As a lotion for *chronic strumous opacity of the cornea*, either with or without granular lids, fʒj of this tincture is sometimes used with fʒvij of water. Occasionally fʒij may be employed to the ounce of water; but this strength gives acute temporary pain when applied to the everted eyelid by a camel's hair pencil.

TINCTURA JALAPÆ, *L.D.E.*

Tincture of Jalap.

Take of Jalap, coarsely powdered, five ounces (℥vii, *E.*).
Proof spirit, two pints (Ojss, *D.*).
Macerate for seven (fourteen, *D.*) days, then express and strain.

E. Percolate as directed for Tincture of Cinchona.

Remarks. — This tincture is now only half the strength that it was in the old Pharmacopœia.

Medicinal use. — *Cathartic.* Dose fʒj to f℥ss. It is an efficient medicine, but is rarely administered except as an adjuvant to cathartic combinations. Proof spirit is employed, which dissolves both the resin and the starch; the former is the only active portion of the root.

TINCTURA KINO, *L.E.*

TINCTURE OF KINO.

Take of Kino, bruised, three ounces and a half.
Rectified spirit, two pints.
Macerate for seven days, and strain.

E. This tincture cannot be well prepared by percolation. (It can if first mixed with equal parts of fine white sand (*Neligan*).

PTEROCARPUS MARSUPIUM (Diadelphia Decandria; Leguminosæ).

Description. — Kino is obtained from the Pterocarpus marsupium, by making incisions into the trunk and branches. A juice flows out, which is, at first, a pale rose colour, but becomes a deep blood-red, and is very brittle when it dries; this is kino. It is met with in small irregular pieces, the size of a small pea, of so deep a red colour, as to appear almost black. The surface of the pieces is shining, but irregular.

Composition. — *Tannin*, and a peculiar extractive; and *catechine*, which communicates a dark green colour to salts of iron.

Medicinal properties. — *Pure astringent.* Kino agrees closely in its properties with catechu, but is not so powerful, or generally useful.

Uses. — Almost the same as those of catechu. (See TINCT. CATECHU, p. 742.) It is principally used in chronic diarrhœa, as it is supposed to exert a peculiar influence in restraining excessive secretion from the intestinal mucous glands, though it does not interfere with their healthy action (*Dr. Pemberton*). In leucorrhœa and menorrhagia; in relaxed uvula and aphthæ of the mouth or fauces; and as an astringent to flabby ulcers, it is frequently used with benefit.

Doses.—Of the powder, gr. x to ʒss; of the tincture, fʒj to fʒij.

Remarks on the tincture. — Rectified spirit dissolves about two-thirds of the kino; proof spirit does not dissolve so much; hence the former is employed in making the tincture. This preparation is very liable to become gelatinous after having been made for a few weeks; but this change does not always occur. I am informed by the laboratorian at Guy's Hospital, and by other experienced druggists, that no certain opinion can be formed, from the appearance of the kino employed, as to whether this effect will take place or not in any particular instance. Pereira conjectures that it is only Botany Bay kino which undergoes this change; but he does not offer any reason for his opinion.

Incompatibles. — All preparations of iron. It is generally combined with chalk mixture.

TINCTURA KRAMERIÆ, *D.*

Tincture of Rhatany Root.

Take of Rhatany root, in coarse powder, eight ounces.
Proof spirit, two pints.
Macerate for fourteen days; strain, express, and filter.

Medicinal properties and uses.—*Astringent.* (See Infusum Krameriæ, p. 356.)

Dose. — ♏xxx to fʒj.

TINCTURA LACTUCARII, *D.*

Tincture of Lactucarium.

Take of Lactucarium, in fine powder, four ounces.
Proof spirit, two pints.
Prepare by percolation, as directed for Tincture of Myrrh; or maceration with *coarse* powder for seven days.

Medicinal properties and uses. — *Sedative* and *hypnotic*, or capable of producing sleep. (See Extract. Lactucæ, p. 330.)

Dose. — ♏x contain gr. j of lactucarium; the dose is therefore large, — ♏xx to fʒjss.

TINCTURA LAVANDULÆ COMPOSITA, *L. D.*

Compound Tincture of Lavender.

Synonyme. Lavender Drops. Spiritus Lavandulæ compositus, *Ph. L.* 1824, and *Ph. Ed.*

Take of Oil of lavender, a fluid drachm and a half.
Oil of rosemary, ten minims.
Cinnamon, bruised,
Nutmegs, bruised, each, two drachms and a half.
Red saunders wood, sliced, five drachms.
Rectified spirit, two pints.
Macerate the cinnamon, nutmeg, and red saunders wood for seven days in the spirit; then express and strain, and dissolve the oils in the strained mixture.

D. Oil of lavender, fʒiij; Oil of rosemary, fʒj; Cinnamon, ℥j; Nutmeg, ℥ss; Cloves, Cochineal, of each, ʒij; Rectified spirit, Oij. Macerate fourteen days.

Remarks. — The Dub. tincture and Edin. spirit differ from that of London in having cloves, which produce a difference in the flavour, and should be remembered in dispensing, though the medicinal properties of all are so much alike that no important error would be made by substituting one for another.

LAVENDER, LAVANDULA SPICA (Didynamia Gymnospermia; Labiatæ).

Description. — Lavender is too well known in our gardens to require description. The flowers are the only part used officinally; they yield a very fragrant volatile oil when distilled with water. The most important preparation is the compound tincture.

Properties. — *Stimulant and stomachic.*

Uses. — Compound tincture of lavender is extensively used by women, under the name of "lavender drops," as a stimulant in ordinary languor, or to relieve the pain and languor of dysmenorrhœa. It is a favourite addition to various anti-hysterical and stomachic mixtures. The red saunders wood is merely used for the sake of its colour.

Dose. — f℥ss to f℥ij.

Officinal preparations. — Liquor Potassæ Arsenitis.

RED SAUNDERS WOOD, PTEROCARPUS SANTALINUS (Diadelphia Decandria; Leguminosæ).

Description. —This is imported in billets, which are heavy, and dark brown externally; internally, they are deep red, variegated with lighter red rings.

Composition. — *Santalin* (peculiar colouring principle).

Uses. — Simply as a colouring article, for which it is employed in its only officinal preparation — the Compound Tincture of Lavender.

TINCTURA LIMONUM, *L.D.*

TINCTURE OF LEMONS.

Synonyme. Tinctura Limonis, *D.*

Take of Lemon peel, fresh, three ounces and a half.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

D. Lemon peel, fresh, ℥v; Proof spirit, Oj.

Medicinal properties and uses. — Agreeable flavour.

Dose. — ♏xxx to f℥ij.

TINCTURA LOBELIÆ, *L.D.E.*

TINCTURE OF LOBELIA.

Take of Lobelia, powdered, five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*) days; then express and strain.

E. This tincture is better prepared by percolation, like Tincture of Capsicum.

Medicinal properties and uses. — See below.

Dose. — ♏xv to ♏xxx.

LOBELIA INFLATA, INDIAN TOBACCO (Pentandria Monogynia; Lobeliaceæ).

Description.—Lobelia is a small herb, from six inches to two feet high, bearing the flowers in an inflated capsule. It is sent into this country from New Lebanon, in the state of New York, packed in small rectangular paper cases, about 8 inches long, 4 inches wide, and 2 inches deep, which contain half a pound each. The whole plant is medicinal, but the stalk, leaves, and flowering parts are most powerfully so.

Plants for which it may be mistaken. — In the dried state, it may be mistaken for Rhus toxicodendron. It is distinguished by the brighter greenness of its colour, and by the numerous little bladder-like calyces attached to its slender stalks, within each of which may generally be seen the pale-blue dried flower very slightly projecting beyond its extremity.

Composition. — Lobelia has not been carefully analysed; but Pereira thinks he has found a peculiar volatile, acrid principle, and an acid. A principle has also been announced, which resembles nicotine. Water, alcohol, and ether dissolve its active principles.

Medicinal properties. — It closely resembles tobacco, and hence derives its name of Indian tobacco, having been long used among the North American Indians. When chewed, it excites an acrid, burning sensation in the throat, like that of tobacco. It causes severe nausea and vomiting, diaphoresis, and sometimes purging; and its action is accompanied by extreme prostration. It promotes expectoration, without exciting cough. In large doses it has frequently occasioned death, preceded by vomiting; but, in general, its action is most severe when this effect is not produced. Its employment requires caution, as some people are peculiarly susceptible of its influence.

Uses. — Lobelia is chiefly used in the paroxysm of *spasmodic asthma*, in which, by the general testimony of writers, it frequently produces remarkable benefit. It may be given either to excite nausea or vomiting, or in small and repeated doses. It is generally found to be of little value when given in the intervals, but to produce its good effects speedily if administered during the paroxysm. It seems to lose its effects if its use is long continued. Christison has found it of use in the spasmodic dyspnœa attending emphysema of the lungs and some organic diseases of the heart. It has been used as an injection in strangulated hernia, and has been given in hooping cough and catarrh.

In the treatment of *bronchitis*, "especially in infants and young children, it seems to act like a charm: when the early acute symptoms have in some measure subsided, and when the membrane is so loaded with mucus that decarbonisation of the blood is no longer properly performed, the blue, livid colour of the surface will often rapidly disappear, and a more healthy hue take its place. After many years' extensive use, we have found it to surpass all other medicines as an expectorant; we have frequently been astonished at the ease with which the mucus is expectorated after this medicine has been taken. In the bronchitis of adults, when the blue appearance of the skin is increasing, it is advantageously combined with small and repeated doses of sesquicarbonate of ammonia" (*Braithwaite*).* The dose used by this writer is, ten drops for an infant, gradually increased till vomiting is produced; for an adult, ♏xxx, every few hours, of a tincture prepared from ℥j of lobelia in Oj of proof spirit, which is rather less than half the officinal strength.

Dose and administration. — Of the *powdered* plant, gr. iv to ℈j; of an *infusion* (℥j to Oss of boiling water), f℥j; of the tincture, ♏xv to ♏xxx or ♏xl.

Officinal preparations. — Tincture, and Ethereal Tincture.

TINCTURA LOBELIÆ ÆTHEREA, *L. E.*

ETHERIAL TINCTURE OF LOBELIA.

Take of Lobelia, powdered, five ounces.
Ether, fourteen fluid ounces.
Rectified spirit, twenty-six fluid ounces.
Macerate for seven days; then express and strain.

E. Lobelia, in moderately fine powder, ℥v; Spirit of sulphuric ether, Oij.

This tincture may be made by percolation, like Tincture of Capsicum, or by maceration for seven days.

Medicinal properties and uses. — The same as those of the simple tincture, but the ether makes it less depressing, and it appears to act better in some cases of spasmodic dyspnœa.

Dose. — ♏xv to ♏xxx.

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* Med. Retrospect, vol. i. p. 97

TINCTURA LUPULI, *L. D. E.*

TINCTURE OF HOPS.

Synonyme. Tinctura Lupulinæ, *D.* Tinct. Humuli.

Take of Hops, six ounces.
Proof spirit, two pints.
Macerate for seven days; then express and strain.

D. Lupulin, ℥v; Rectified spirit, Oij. Macerate fourteen days.

E. Any convenient quantity of hops, recently dried; separate by friction and sifting the brownish-yellow powder attached to their scales; then, take of this powder, ℥v; Rectified spirit, Oij; and prepare the tincture by percolation or digestion, as ordered for Tincture of Capsicum.

HUMULUS LUPULUS (Diœcia Pentandria; Urticaceæ).

Description. — Hops are the catkins or strobiles (fruit) of the Humulus lupulus. It is only the female plants which yield them.

Composition. — When hops are rubbed or sifted, a number of small, golden-yellow scales are obtained, which are termed lupuline glands, and appear to contain the active principles of the hops. If the hops are too ripe, they contain a smaller number of these grains. Their composition is *volatile oil*, a *bitter* principle (*lupuline*), and a large quantity of *resin*. The infusion of hops contains tannic, sulphuric, and oxalic acids.

Properties. — *Hypnotic; stomachic; and antiseptic.* The hypnotic property is thought to reside in the volatile oil, and a pillow stuffed with hops frequently promotes sleep; this property became celebrated in consequence of the advantage which it proved to George III. during the sleeplessness of mania. Dr. Ives states that the tincture made from the lupuline grains is an effective hypnotic in restlessness arising from nervous irritability and in delirium tremens. It does not, like opium, cause headache or constipation. It is, however, denied by many writers that the lupuline grains contain any principle except the bitter one. An infusion or decoction of hops is sometimes used as an anodyne fomentation. Hops possess some principle (bitter?) which retards or prevents decomposition, and they are therefore employed to put a stop to the process of fermentation in beer and other fermented liquors.

Uses. — The uses of hops have been indicated in describing their properties. Besides the cases there mentioned, they are used to relieve pain in gout and rheumatism, but with very uncertain effects.

Dose and administration. — The tincture is an objectionable form, in consequence of the large quantity of spirit which must be taken to obtain any active quantity of the volatile oil. According to Dr. Christison, the dose should be f℥j to f℥jss in order to obtain any hypnotism, but the dose usually prescribed is fʒss to fʒjss.

TINCTURA MATICO, *D.*

TINCTURE OF MATICO.

Take of Matico leaves, in coarse powder, eight ounces.
Proof spirit, two pints.
Macerate fourteen days; strain, express, and filter.

Medicinal properties and uses. — *Astringent.* (See INFUSUM MATICO, p. 358.

Dose. — ♏x to fʒj.

TINCTURA MYRRHÆ, *L. D. E.*

TINCTURE OF MYRRH.

Take of Myrrh, bruised, three ounces (℥iv, *D.*, ℥iijss, *E.*).
Rectified spirit, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

E. Pack the myrrh, in moderately fine powder, very gently, without any spirit, in the percolator; then pour on the spirit, and, when thirty-three fluid ounces have passed through, agitate well to dissolve the oleo-resinous matter which first passes, and which lies at the bottom. This tincture is much less conveniently obtained by the process of digestion for seven days.

BALSAMODENDRON MYRRHA (Octandria Monogynia; Terebinthaceæ).

Description. — Myrrh is a spontaneous exudation from the bark of the tree, which is at first soft and pale coloured, but becomes gradually harder and redder. It is met with in small irregular pieces, of a reddish-brown colour, which are frequently partially covered with a lighter-coloured powder from the rubbing of the pieces together. It is generally more or less brittle; but, if it has not been exposed to the air, it is frequently sufficiently soft to yield to the pressure of the nail, which forces out a small quantity of a volatile oil. It has a peculiar and very agreeable odour, which distinguishes it from every other substance for which it could be mistaken.

Composition. — Myrrh is a gum-resin, containing volatile oil, resin, and gum. It is, therefore, only partially soluble in either water or spirit, and proof spirit would be the proper menstruum for its solution; but, as the gum does not possess medicinal properties, rectified spirit is ordered, which dissolves only the resin.

The tincture becomes milky on the addition of water, owing to the separation of the resin.

Medicinal properties. — *Tonic; stimulant; emmenagogue.* It promotes the appetite, quickens the circulation, increases the heat of the body, and diminishes excessive mucous secretion, especially from the bronchial mucous membrane. In large doses it may cause inflammation. It has been supposed to be emmenagogue. Applied locally, it is a tonic and astringent.

Characteristic effects. — It is more stimulant than the bitter tonics, as cinchona and cascarilla. It is not antispasmodic, like the fœtid gum-resins, as assafœtida; and it is more tonic. Its influence over the uterine system is not so well marked.

Uses. — As a stimulant, myrrh is combined with aloes, iron, rhubarb and galbanum, in several of their officinal preparations. It is beneficially used to check the profuse secretion in the chronic bronchitis of old people, in which case its tonic powers also are useful. It is frequently employed as a stimulating astringent gargle in languid ulceration or relaxation of the throat, and is then often combined with nitric or hydrochloric acid. It is in common use as an application to the gums when they are soft and spongy.

Dose and administration. — Myrrh is seldom prescribed alone. The dose of the powder is from gr. v. to gr. xxx, in combination with various substances. If the tincture is employed in a mixture or gargle, it should be combined with some solution of sugar, in order to suspend the resin. Dose, ♏xx to f℥j.

TINCTURA NUCIS VOMICÆ (*Ph. D.* 1826. Not now Off.).

Tincture of Nux Vomica.

Take of Nux vomica seeds, scraped, two ounces.
Rectified spirit, eight ounces.
Macerate seven days, and filter.

Properties and uses. — See Strychnia, p. 196.

Dose. — ♏x to ♏xxx.

TINCTURA OPII, *L.D.E.*

Tincture of Opium.

Synonyme. Laudanum. Tinctura Thebaica.

Take of Opium, powdered, three ounces.
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days; then express and strain.

E. Opium, sliced, ℥iij; Rectified spirit, Oj and f℥vij; Water, f℥xiijss. Digest the opium in the water, at a temperature near 212°, for two hours; break down the opium with the hand; strain and express the infusion; macerate the residuum in the rectified spirit for about twenty hours, and then strain and express very strongly. Mix the watery and spirituous infusions, and filter.

This tincture is not easily obtained by percolation.

Remarks.—The colour of this tincture varies with the specimen of opium from which it is prepared, being sometimes darker than at others. It has the peculiar taste and smell of opium. Its properties and uses are described under the head of Opium. Being in solution, a dose produces more effect than the equivalent quantity of solid opium.

Dose and other details.— See Opium.

OPIUM.

Botany.—Papaver Somniferum (Polyandria Monogynia; Papaveraceæ). Cultivated in Turkey, Egypt, the East Indies, and other places.

Preparation of opium.—Opium is obtained from the capsules of the Papaver Somniferum or white poppy, before they are fully ripe. Longitudinal or transverse incisions are made, sufficiently deep to penetrate the outer layers, but not deep enough to divide the capsules entirely. The juice exudes from these incisions and in a few hours is scraped off; by which operation it becomes mixed with portions of the capsule and other foreign impurities. The juice from many plants is afterwards beaten together, and made into an adhesive mass, with saliva. Sometimes it is fraudulently mixed with substances which are simple adulterations. There are several kinds of opium, which differ from each other in appearance and strength. The following are the principal varieties.

Varieties.—*Turkey* or *Smyrna* opium is the best, and the most commonly known in this country. It is in masses weighing from half a pound to one or two pounds, generally irregular or circular, and slightly flattened. The outside of the masses is covered with capsules of the rumex or dock. It is hard externally, though it may be easily cut, and the interior yields to the finger. Its colour, when freshly cut, is brownish; but it soon becomes dark and almost black on exposure to the air. Its odour is peculiar and not to be described, as it resembles nothing but itself; and the same remark applies to the taste. This variety generally yields a larger proportion of morphia than the others, which amounts, on an average, to about ten per cent., but varies between four and fourteen per cent. It is seldom adulterated.

Constantinople opium is inferior to the last. "It is probable that opium of unequal qualities, and procured in several parts of the Turkish empire, is carried to the capital, and being exported thence, bears the name of Constantinople opium" (*Pereira*).

East Indian opium is chiefly consumed in China; but a little sometimes comes to this country. It is in round balls, which weigh about three pounds each; these are quite hard externally, and are covered with a thick layer of leaves; but internally, they are very soft and homogeneous. This kind generally contains about five per cent. of morphia.

English opium is seldom now to be met with. It was at one time successfully cultivated by Mr. Young, near Edinburgh, and by other persons in various parts of England; but it is not now a remunerating article, and has ceased to be cultivated. It was made up into small flattened cakes, which had an odour resembling that of hepatic aloes (*Pereira*). It contained about five per cent. of morphia.

Egyptian opium is generally inferior to either Smyrna or Constantinople opium, but its quality is variable, sometimes yielding as much morphia as the Turkey kind, but in general containing less.

Composition. — Opium is an extremely complex substance. Besides a variety of salts, to be more fully described hereafter, it contains a *bitter principle*, *gum*, sometimes a little *starch*, and much *colouring matter*; and probably, also, a *volatile odorous oil*; for though this has not been obtained separate, yet water distilled from opium possesses the characteristic odour of the drug in a high degree. The following are its other constituents, and the characters by which they are distinguished.

Morphia.—See MORPHIA, pp. 168, 169.

Narcotina, $C^{46}H^{25}NO^{14}$. — Neutral, but capable of combining with acids; colourless; soluble in ether; *insoluble* in *cold* water, in alkalies, or in weak acetic acid, unless this is used in great excess (*Pereira*). It gives a greasy stain to paper when heated. It was formerly thought to be the stimulating principle of opium; but this opinion has been proved not to be correct, and it has since then been considered inert; but Dr. O'Shaughnessy has shown that it is a *febrifuge* of considerable power, having cured many cases of intermittent fever by its means.*

Codeia, $C^{35}H^{20}NO^5$ or $C^{35}H^{21}NO^6$. — Alkaline; crystalline; soluble in hot or cold water, thus differing from morphia; insoluble in potash or soda, but not precipitated by ammonia from a dilute solution. It does not become blue on the addition of sesquichloride of iron, but is slightly reddened by nitric acid. It has lately been sometimes used as a substitute for morphia; but though similar in its effects, it is uncertain, and liable to cause vomiting. Gregory (quoted by Pereira) says that four or five grains have caused excitement resembling intoxication.

Narceia, $C^{28}H^{20}NO^{12}$. — Present in very small quantity; alkaline; crystallises in long silky needles; dilute nitric, sulphuric, and hydrochloric acids, and also iodine, render it blue, but sesquichloride of iron does not. *Inert.*

Meconine, $C^{10}H^5O^4$ or $C^{20}H^9O^7+HO$. — Neutral; crystalline. When fused with chlorine it has a blood-red colour. *Inert.*

Paramorphia, or Thebaia ($C^{25}H^{14}NO^3$), seems like a false morphia, as it becomes red with nitric acid, but not blue with sesquichloride of iron. *Inert.*

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* Lancet, 1838-9, vol. ii. p. 606.

Papaverine ($C^{40}H^{21}NO^{8}$), discovered by Merck, is a white crystalline, feeble alkaloid. Insoluble in water and but slightly soluble in spirit or ether. It becomes blue on the addition of concentrated sulphuric acid. *Its salts are generally oleaginous* at first, and ultimately crystalline.* Properties unknown.

Opianine ($C^{66}H^{36}N^{2}O^{21}$) crystallises in long, colourless, transparent, brilliant needles. It is decidedly alkaline. It is insoluble in water and very sparingly soluble in boiling alcohol. It is unchanged in colour by sulphuric acid, but nitric acid dissolves it, forming a yellow solution. Hinterberger's experiments show that it is *narcotic*. The effects produced upon two cats by equal doses of morphine and opianine were precisely similar.†

Porphyroxine is of doubtful existence.

Meconic acid, $C^{14}HO^{11}$ or $C^{14}HO^{11}+{}^{9}HO$. — This is by far the most important chemical constituent of opium, though it is inert medicinally. It is acid, and forms insoluble salts with oxide of lead and with barytes. It acquires a deep blood-red colour, on the addition of sesquichloride of iron, and this is a very delicate test. Sulphocyanic acid, however, also causes a red colour with this compound of iron; but sulphocyanate of iron loses its red colour on the addition of bichloride of mercury, which meconate of iron does not; and hydrosulphocyanic acid and the sulphocyanides are reddened by terchloride of gold, which meconic acid is not (*Pereira*). Some acetates also cause a red colour with sesquichloride of iron, but they do not occasion a precipitate with acetate of lead, nitrate of silver, or chloride of barium, which meconic acid does.

The *bitter principle* has been already mentioned, but it is here again alluded to, as it appears to possess medicinal powers. It will be seen from the above list, that morphia, opianine, and codeia are the only constituents of opium which possess anodyne or narcotic properties; but morphia is really very little more powerful than opium itself. It is therefore probable that some other ingredient is narcotic; and Butter (quoted by Pereira) asserts that the bitter principle does actually produce powerful medicinal effects.

Tests for opium. — As this drug is often taken as a poison, these become very important. Opium, or any of its preparations, may be considered to be impure meconates of morphia; and we must therefore search for morphia and meconic acid. With the *morphia*, if solid, or in a tolerably strong colourless solution, nitric acid produces a bright red colour; sesquichloride of iron, a blue, which is lost on the application of heat; and iodic acid is decomposed, and its iodine liberated, which may be detected by the addition of starch. With *meconic acid*, sesquichloride of iron gives a deep cherry-red colour, which is *not* destroyed on the addition of bichloride of mercury or of sulphuric acid with heat; the non-effect of the bichloride distinguishes this from the red colour produced by sulphocyanic acid in the saliva, or in infusion of mustard; and the non-effect of sulphuric acid and heat shows the absence of acetic acid or an acetate, which also produce a red colour with sesquichloride of iron. The meconic acid is generally the only principle which can be detected in actual cases of poisoning; and under the most favourable circumstances, we shall fail to find more than this and morphia. But as neither of these principles is known to exist in anything but opium, the proof of their presence is conclusive evidence, in a chemical point of view, of the presence of this drug. The method practised by Mr. West, of Leeds, appears to me the best I am acquainted with. The peculiar smell of opium is often recognised on first opening the stomach, though it quickly disappears; but it is also generally strongly marked in the water distilled from any fluid containing opium. He therefore boils the materials to be examined for a few minutes, and collects the distilled fluid, the odour of which, is, in some degree, a guide as to further investigations. The materials are then thrown upon a filter and washed, and acetate of lead is added in great excess. This precipitates the whole of the meconic acid, and with it, much of the gum, starch, and glutinous and colouring ingredients. This precipitate is to be removed, and preserved for further use, and sulphuretted hydrogen is then passed through the solution until no further precipitate is formed, and the sulphuret of lead thus thrown down carries with it nearly the whole of the remaining organic and colouring matters. The liquor is then filtered, and the clear solution evaporated in a water-bath nearly to dryness. If opium has been present, a *brownish-green*, *not* in this case a *blue* colour, will be formed on the addition of sesquichloride of iron; but the characteristic red colour will be obtained on adding nitric acid. *These tests then show the presence of the morphia.* Far more decided effects will however be obtained from the precipitate of meconate of lead first thrown down. This must be well washed, and the precipitate suspended in water, through which sulphuretted hydrogen is passed. This forms sulphuret of lead, and the meconic acid is set free and is dissolved by the water, in which the addition of sesquichloride of iron produces the characteristic deep red colour. Or the meconate of lead, after being washed, may be put into a test tube, and a drop or two of sulphuric acid added. This forms sulphate of lead, and the meconic acid is liberated as before. Mr. West prefers nitric to sulphuric acid, as it decomposes the meconate equally well, and produces no precipitate in the fluid to be tested.

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* Pharm. Jour. Dec. 1848, p. 293.

† Ibid. April, 1853, p. 498.

It must be borne in mind that opium may be swallowed in large quantities, and yet not a trace of it be found in the stomach when death occurs, within even a few hours.

Medicinal properties of morphia.—I shall here only describe the properties in which the preparations of morphia differ from those of opium, and the cases in which the first are used in preference to the latter. It is singular that great difference of opinion should prevail as to some of these points; but general experience has proved that the preparations of morphia are less stimulating than those of opium, and less liable to cause headache, nausea, constipation, and other dyspeptic symptoms. It is not uncommon, however, for patients to have an attack of vomiting in the morning, after having taken morphia at night. They do not produce the same exhilarating effects, and therefore cannot be so generally used by opium eaters (*Pereira*). I knew one case, however, in which a confirmed opium eater being forcibly restricted to the use of acetate of morphia, found this a good substitute, and was immediately aware when the solution was made weaker than usual. Like opium, they cause *contracted* pupils, and frequently *intense itching* of the skin. They are not so liable (*Pereira*), are more liable (*Thomson*), to cause sweatings than opium. Christison has observed that they more frequently induce a calm, sleepless state of reverie than opium, and that if they fail in producing rest, they much less frequently cause wild, painful dreams and nervous irritability. Pereira remarks that they frequently cause difficulty in voiding urine, in men, owing to paralysis of the bladder; but I have not been able to obtain any confirmation of this observation, after extensive enquiry amongst practitioners of great experience in both hospital and private practice.

Of the preparations of morphia the hydrochlorate is much the best, being the most uniform in its composition, and less liable than the acetate to cause sweating.

Uses.—In any case in which it is an object to avoid excitement, the preparations of morphia are to be preferred to those of opium; and as they are also almost tasteless, they possess an advantage when it is important to conceal the nature of the medicine prescribed. They are more frequently used *endermically* (or applied to a freshly blistered surface), than the preparations of opium. They are often given in combination with nitrate of silver in pyrosis, and in gastrodynia.

Dose and administration.—It has been supposed that the salts of morphia ought to be nearly ten times as powerful as opium, since it yields only ten per cent. of the alkali, and no important amount of any other narcotic principle has been discovered. Experience has, however, shown that they are not more than about twice as strong, and the usual dose corresponds with this, being from gr. ⅛ to gr. ¼; or, as a full sedative, gr. j. They may be given either in solution, or in the form of pill.

Medicinal properties of opium.—Stimulant; narcotic; astringent; diaphoretic. The effects of opium differ according to the dose in which it is given. In a *small* dose, from a quarter of a grain to a grain, it is a general stimulant. The pulse rises in a few minutes, and is increased in frequency about five to ten beats in the minute; it gradually subsides and falls as much below the average number, and, at the end of an hour, there is little difference from its usual standard. The mind becomes cheerful, and the thoughts are excited and rendered more brilliant; this is followed by muscular and nervous depression, and perhaps sleep is induced. The mouth, throat, and tongue become dry: hunger is appeased, but thirst is excited; and the bowels are constipated.

In a *full* dose, gr. j to gr. iij, the pulse is raised even higher than before, but this occurs more quickly, and is much sooner followed by depression; the muscular and nervous languor are greater, and sleep is sooner induced, during which there are frequently dreams, which are sometimes pleasing, sometimes frightful. The sleep is followed by the symptoms previously mentioned, with the addition of headache, which sometimes continues for a long time. It is stated however, by some persons of great experience, that the headache is much modified by the circumstances of the patient. If undisturbed until he awakes spontaneously, there will be little headache; but if he is aroused before this, the headache will be severe.

In *poisonous* doses, gr. v to ℈j or ʒj, there is giddiness and stupor, without previous excitement being recognised. The stupor increases; the patient lies motionless, and has an appearance of the deepest repose; the countenance is generally pale and unmoved; the breathing and pulse are slow and tranquil; the pupils *contracted;* the skin soft, and sometimes moist; he is capable of being aroused, and answers questions, but immediately relapses into the state of stupor; the breathing becomes slower, the pulse imperceptible, and death takes place sometimes, though very rarely, preceded by slight convulsions. If recovery should, however, take place, there is usually sleep for twenty-four or thirty-six hours, and sometimes nausea or vomiting.

Secondary asphyxia from opium. — This term has been applied to the effects which are produced in some cases of poisoning by opium after an apparent recovery from its primary influence. A number of cases are mentioned by Dr. Taylor *, in which the patient had to some extent regained consciousness and the power of motion, and yet death subsequently occurred after an interval of eighteen hours from the swallowing of the poison. A form of secondary bad effects, of even more importance practically, from its frequent occurrence, is so forcibly described by Dr. Griffin †, that I shall use his words rather than my own. "When the results are sinking and faintness without stupor, they commonly arise many hours after the exhibition of the medicine, and are in fact mere symptoms of exhaustion, following the declining influence of an over-dose. They may be removed or alleviated by renewing the opiate in a smaller dose, or, if other considerations render this unadvisable, by stimulants frequently repeated, and eventually by sleep. It is often of great importance that we should remember that a period of sinking and exhaustion is likely to come on from twelve to twenty-four hours after opiates have been discontinued, especially if the previous doses had been large. This is particularly apt to occur in the cases of young children or infants, when the violence of the inflammatory symptoms has gone by, and it has been found necessary to administer opiates. About the time the influence of the opiate is wearing out, if it has been a large one, the eyes look sunk, the eyelids lie half open, disclosing a small portion of the white cornea, the face is deadly pale, the skin clammy, and the whole appearance of the child suggests an apprehension that it is dying. Yet if a little nourishment or some slight stimulant is given, or even a little time be allowed to elapse, the heart will recover its tone, and the little patient will revive." The reviewer adds—"This is a faithful picture of what we have repeatedly observed after the administration of even moderate doses of Dover's powder to young infants."

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* Taylor, on Poisons, 1848, p. 583.

† Griffin's Med. Problems, quoted in the Med. Chir. Rev. N. S. vol. iii. p. 57. 1846.

Characteristic effects of opium.—Powerful narcotic and hypnotic. At first, stimulant, followed by depression. Causes increased mental activity, but never intoxication; does not cause delirium. Checks nearly all the secretions, especially those from mucous membranes; but increases that from the skin. Causes long continuing constipation, thirst, nausea, and headache. Generally produces *contracted* pupil. These effects are considered to be dependent upon cerebral nervous congestion, which is induced by opium. It sometimes causes retention of urine, from paralysis of the muscular coat of the bladder. There is often intense itching of the skin the day after taking an opiate.

Effects of the habitual use of opium.—They are very different under different circumstances. Whilst under its influence, the opium eater is cheerful, vivacious, and enjoys pleasing thoughts; but as soon as the stimulus subsides he is the prey of the most extreme depression and wretchedness. It is, however, so fascinating a habit that, notwithstanding his acute recollection of the sufferings produced by it, the author of the "Confessions of an English Opium Eater" has returned to this miserable practice. Some persons have discontinued it, after long indulgence in it, and have never returned to it.

It was formerly supposed to be invariably injurious to the health; but Dr. Christison's investigations have thrown much doubt upon it, as regards Englishmen; and it is known that many of the Chinese, and other persons also, live to an advanced age, in the practice of opium eating or smoking, if their circumstances are easy and their food abundant. Opium eating is very common in the fenny districts (Lincolnshire, &c.) of this country; but the effects to be now described, have not been observed in our own population. Amongst the Turks, or any people whose food is scanty at the time that they take the drug, it produces at length premature old age and almost fatuity; the eyes become sunken and leaden-hued; the body is emaciated; the spine bent; the gait lame; the countenance withered and yellow; and both mental and bodily power being exhausted, death is seldom delayed beyond the age of forty years. It is remarkable that diarrhœa is sometimes produced by its habitual use. The *glassy polish* of the skin alluded to in the following paragraph is not generally mentioned by writers on this subject; but Mr. Fortune's character for observation and accuracy renders him an unexceptionable witness:—"The effects which the immoderate smoking of opium had produced upon this man (described as being wealthy and luxurious) were of the most melancholy kind. His figure was thin and emaciated, his cheeks had a pale and haggard hue, and his skin had that peculiar glassy polish by which an opium smoker is invariably known." [*]

Diagnosis of poisoning by opium. — The symptoms somewhat resemble those produced by intoxication, or by concussion of the brain. They are distinguished from the former, in some instances, by the history; but in the absence of this, by the smell of the breath, which is alcoholic in intoxication; and by the face, which is usually somewhat flushed, whilst it is pale and composed in poisoning; there is, however, no flushed face in the intoxication of gin drinkers; there may be evidences of previous vomiting in intoxication; in both cases the patient may generally be aroused so as to give some sort of answers; but this is less easy in deep intoxication than after opium. "If you kick a drunken man he will swear;" not so if it is a case of poisoning by opium. The breathing is not so tranquil in intoxication as in poisoning.

From concussion it is distinguished by the absence of bruises, and by the state of the pupil, which is very variable in concussion, but is almost always *contracted* in poisoning by opium. If a patient labouring under concussion is roused, the pulse suddenly rises to 90 or 100 or 120 beats in the minute, and the action of the carotids is much increased; which is not the case in poisoning by this drug.

Cause of death. — Paralysis of the respiratory muscles and of the heart, which puts a stop to the aeration of the blood. Hence, in the treatment of such cases, artificial respiration should be practised, and the patient must be kept in constant muscular action, until the poison has had time to expend its power.

Period of safety. — The longest interval I have seen recorded between taking opium and death is twenty-four hours. It generally occurs in from six to twelve hours.

Post-mortem appearances. — Congestion of the veins of the brain and lungs, and sometimes effusions of serum or lymph. There are no local inflammations. The blood is frequently fluid.

Quantity requisite to cause death. — This varies exceedingly, in different cases; and, by habit, an immense quantity may be taken with impunity. Infants appear to be peculiarly susceptible to its action, and it must be given to them with extreme caution. Mr. Everest has mentioned the death of an infant two days old, which was caused by ♏jss of laudanum.[†] In the case of adults who are unaccustomed to its use, death has been caused by as small a dose as fʒij; but many cases have recovered, in which f℥ss to f℥jss has been taken. From f℥ss to ℥jss of laudanum would, probably, generally cause death, in the absence of suitable treatment; but in some diseases, as cancers of the uterus, f ℥ij have been taken several times daily; and in one instance, quoted by Pereira, as much as three pints of laudanum, besides a quantity of solid opium, was taken in the course of a day.

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[*] Fortune's Visit to the Tea Districts of China and India, p. 51.

[†] Lancet, 1842-43, vol. i. p. 758.

Antidotes and treatment. — There is no known chemical antidote. It is generally stated, that the stomach pump should be used; but an emetic should always be premised; if this will answer, the pump is much better dispensed with. In this case sulphate of zinc or of copper, and tickling the fauces, should be resorted to; tartar-emetic or ipecacuanha should be avoided, as they act too slowly, and cause greater depression; if neither the zinc nor the copper is at hand, mustard should be freely given to act as a stimulating emetic. Of what may be supposed to be chemical antidotes tincture of galls is the best. *Cold water* should be dashed over the head and chest, and, if necessary, *artificial respiration* should be kept up for several hours; this is in general most easily accomplished by forcibly compressing the sides of the chest, and pressing upon the abdomen at the same time, by which means the air is expelled from the lungs; on removing the pressure, the elasticity of the ribs causes them to expand, and air rushes into the chest, to be again expelled by pressure as before. If this is not sufficient, galvanism should be employed: a sponge soaked in salt and water should be fastened to one of the wires from the battery and laid upon the neck or above the clavicle; and another sponge similarly treated should be laid upon the front or side of the chest. When it is laid on a sudden spasmodic shudder runs through the system; the chest expands, and air enters the lungs. It is of extreme importance to keep up *constant muscular action;* for which purpose, *flagellation* is sometimes necessary, in addition to the support of two persons holding the patient in an erect posture and dragging him along. It has been proposed to use a bunch of nettles for this purpose; but the practice is not safe, as dangerous inflammation may follow. *Irritants* to the feet, as mustard poultices; and *diffusable stimulants. Venesection* may be necessary after the action of the emetic, but it is generally useless if not prejudicial. *Vegetable acids* ought *not* to be given until *after* the stomach has been thoroughly emptied.

Uses of opium. — These are so numerous, that it is almost impossible even to name them. It is given in most cases in which the object is to allay pain, or to produce sleep. In various *cancerous* affections, it is sometimes given in enormous doses. In *diarrhœa* and *dysentery*. It is generally combined, in the first, with some astringent or absorbent, as catechu or chalk; and in the latter, with ipecacuanha or some mild preparation of mercury. In *excessive mucous discharges* or *irritability of mucous membranes;* and hence it enters into almost all cough mixtures. In *bronchitis*, or in *pulmonary catarrh*, it should be given in the stage which is accompanied by increased secretion; previous to this, it is often injurious, and depletion is the necessary treatment. In the *chronic* or *influenza* bronchitis of old people, with excessive secretion of mucus, it must be employed with caution; since by lessening the cough, and thereby the expulsion of the secretion, it may allow a fatal accumulation of it, and the patient may die suffocated. In such cases, the stimulant balsams and sulphate of zinc are much to be preferred. In *pneumonia* and inflammation of *parenchymatous* structures, as *hepatitis*, it seldom does good, and is sometimes injurious; but even these cases sometimes require its employment. In *cerebral inflammation* it is generally injurious. In *spasmodic asthma* its good effects are very temporary. In *nephritis* and *cystitis* it is of the utmost value, by lessening the sensibility of the mucous membrane to the irritating urine. In *acute gastritis*, after free depletion, a copious opiate, as ♏lx or ♏c of laudanum, or gr. iij or gr. iv of solid opium, should be given. Both the bleeding and the opiate may have to be repeated, or the opiate alone, or combined with calomel. Also, in *enteritis*, it is employed in the same way. In *peritonitis*, under similar circumstances.

In *puerperal fever*, it has been highly extolled. This term is so general, that it includes several of the most opposite forms of disease. In the acute peritonitis of lying-in-women, accompanied with considerable power, and altogether of a sthenic character, free depletion by bleeding and calomel is the treatment to be relied on; but in that form which is early accompanied by typhoid symptoms, the characteristic features of which are irritability and want of power, opium may be freely used. It should be given in repeated doses, sufficient to keep up its stimulant operation, whilst, at the same time, its soothing and narcotic properties will produce their influence in allaying the state of irritability, or, as Dr. Billing terms it, "increased excitability." The dose, in these cases, should be a *full* one. In *acute rheumatism* it has long been employed, and Dr. Corrigan has called especial attention to its value. He says that, in order to obtain its good effects, the solid opium must be given in two grain doses every one or two hours, until the patient finds the pain abated, after which it must be continued according to the degree of suffering; a plan of treatment which coincides with Dr. Dover's, as mentioned under the head of Pulv. Ipecac. co., p. 671. He says that in insufficient, *i.e.* small doses, it does harm rather than good. It is more valuable in the diffuse or fibrous than in the synovial form of rheumatism. (See ALKALIES, QUININE, *Uses*, p. 186.)

It is almost always injurious in *inflammations* of the brain, yet there are many cerebral diseases in which it acts very beneficially. In some forms of *insanity*, especially melancholy, it is used with advantage. In *intoxication* it is frequently used to restore self-possession, and remove the effects of intemperance. In *fever*, with low muttering delirium, it sometimes acts like a charm in doses of gr. ½ every two hours. In this disease it may be combined with camphor. In *fever*, accompanied with great watchfulness or delirium, with more power than in the last case, it is highly spoken of by Dr. Graves, if it is combined with tartar-emetic; raving excitement, a flushed eye, and a furred tongue, are not considered by this eminent physician to contra-indicate its employment in this combination, but are likely to be benefited by it. In these cases, the opium must be given in full doses. See *Graves's* Clin. Lect. 1848, pp. 197-248.

Its *general* employment in *fever* is to be condemned; but the late Mr. Taylor, of the West Derby Fever Hospital, spoke to me most strongly of its beneficial effects. The patients chiefly admitted were Irish, who were half starved before being attacked by fever; and he was in the habit of giving one, two, or three grains of opium, and repeating the dose once or oftener, until his patients slept, quite undeterred by delirium: he did not cease until they were completely tranquillised, and he spoke of its effects being remarkably good; the patients awoke tranquillised, the head symptoms had abated, and there were no bad consequences. He kept the head cool by lotions during its administration, if necessary.

I have not had sufficient opportunity of testing this mode of treatment which has been occasionally advocated by other physicians; and cannot pass any opinion from my own experience; but Mr. Lister, who succeeded him in the charge of the hospital, speaks of it in terms of almost unqualified condemnation: and even Mr. Taylor's own most experienced nurse has often told me that "his pills used to make the patients rave, and I never thought they did so well."

In *intermittent fevers*, opium is generally acknowledged to be of frequent service in preventing or cutting short the attack, if a full dose is taken at the commencement of the cold stage. Hence in Lincolnshire, and probably in the other fenny counties of England, there is an immense consumption of this drug; the inhabitants commencing the practice of taking it to cure their agues, and continuing it because they have become in some degree opium eaters.

In *delirium tremens*, opium is our most important remedy, and must be given in full doses, frequently repeated; in this disease it acts more favourably than the salts of morphia, and it is generally combined with some stimulant or with camphor. See p. 145. In *tetanus* it has been given in enormous doses, and the susceptibility of the system to its influence seems to be much diminished; but though some cases recover under its use, there is now much less confidence felt in it, in the treatment of this disease, than was the case formerly. I remember a case, but cannot recall the particulars, in which a large quantity of solid opium was found after death in the stomach of a patient, to whom it had been abundantly administered in this disease. It is not unlikely that, in many other cases, a considerable proportion of the opium given is not taken into the system at all. In severe *headache*, dependent upon loss of blood, opium is very useful.

There is extreme difference of opinion expressed by writers, as to its admissibility in the *convulsions* of *children*; some recommending it almost without restriction, and others as indiscriminately condemning its use. Where the convulsions are owing to intestinal disorder, opium cannot be of any service until the offending matters are removed, and the secretions restored to a healthy state; but if they are dependent upon the irritation of teething, or upon great excitement or disturbance caused by local pain, the administration of an opiate, after the gums have been lanced, is often followed by very good effects. In *puerperal convulsions*, opium should not be given in the first instance; but, at a later period, it is very valuable. Dr. Kennedy was in the habit, in the Dublin Lying-in-Hospital, of bleeding very freely at first, and giving tartar-emetic in nauseating doses; if necessary, the bleeding was repeated, and the antimony was continued. Even, however, after the depletion, the convulsions frequently continued for some time; but when they began to be less powerful, and to have more of the character of the excitement of exhaustion; and when the pulse, though frequent and bounding, was compressible, then he gave a full opiate (tr. opii, ♏xl to f℥j), and the patient speedily became composed, and quickly recovered. Had it been given in an earlier stage, it would have aggravated the disease.

In *hæmorrhages* from the lungs, uterus, or bowels, it is often very usefully employed, and especially at a subsequent period, to allay the irritability caused by excessive loss of blood. In these cases the quantity which is required, and may be safely given, is sometimes very large. Indeed in this, as in all other cases in which opium is requisite, the same rule must be observed, viz.— to give it until its proper effect is produced, the amount being determined by the effects produced, not by the number of grains, more or less, which we might think beforehand would be suitable. Where the restlessness, tossing of the limbs, and exhaustion occasioned by *profuse uterine hæmorrhage* is great, four or five grains of opium may be given at once, and a couple of grains every hour afterwards until tranquillity is obtained. At the same time stimulants may be advantageously employed, which would only be useless, if not injurious, unless accompanied by the tranquillising influence of the opium.

In the *passage of gall stones*, or of *renal calculi*, it is imperatively called for to allay the excruciating pain, and by relaxing the biliary duct or the ureters to favour the passage of the stone. In the *phosphatic diathesis*, it is the only thing which has much power in allaying the morbid irritability of the system (*Prout*). In *chordee*. In *diabetes* it has proved more valuable than any other medicine which has been employed; but it must be given in frequent and full doses. In *poisoning by vegetable acids* it is useful in allaying pain and moderating the violence of their action; and it is often required to relieve the symptoms which occur at a later period in poisoning by the mineral acids. In *mortification*, if accompanied by much pain, and in *gangrena senilis*, Mr. Pott's strong recommendations of opium have been fully confirmed by subsequent experience. In *phagedenic ulceration* it is all important, and must be given *largely* to allay the intense pain. In many *callous* or *varicose ulcers*, in old people whose health is enfeebled by sickness or intemperance, the use of small doses of laudanum (♏x, ter quotidie) produces great improvement; "it appears to promote the most genial warmth, to give energy to the extreme arteries, and thereby to maintain an equal balance to the circulation, throughout every part of the body;" and to animate the dormant energies into healthy action.

The employment of opium in the *constitutional treatment* of severe surgical injuries is very little, if at all noticed by writers on Materia Medica; but it is most important. In many cases, the shock to the system and the subsequent irritation which is set up, are so great, especially if the injury is considerable amongst tendinous parts, that large quantities of this drug are required to tranquillise the system. The following case in the Toxteth Hospital, under the care of Mr. Minshull, of this town*, was communicated to me by Mr. Metcalfe, then resident surgeon, and illustrates the general principles of its employment. A ship's baker of confirmed intemperate habits, who was invariably drunk once a week or oftener, and sometimes continued so for two or three days, fell, whilst intoxicated, and produced a compound dislocation of the left, and a simple dislocation of the right knee. There was great reason to believe that he had long practised self-pollution, and he was, in every respect, a most unfavourable subject. Amputation in the middle of the thigh was immediately performed, and the right knee was reduced. In about two hours after the operation, delirium tremens began to show itself, and f℥ij of laudanum were given at once; he became tranquillised, and the dose was repeated in two hours, and again in three hours; after which, f℥j was given every two or three hours during the first twenty-four hours. The only effect produced was tranquillity; he did not sleep, but was free from pain; the pulse was soft and steady, at about 70; the tongue moist, skin soft, and no thirst. The second day, one or two grains of opium were given every two or three hours, according to his condition: if there were any symptoms of restlessness, the larger dose was given, and it was more quickly repeated. On the third day, one grain was given, at longer intervals. He scarcely slept during this time, but was perfectly easy; he had little desire for food and no thirst, and the stump healed favourably. In six weeks he was walking about, and in good health. It very frequently happens that, if a patient has been of at all dissipated habits, or lives in a crowded or unhealthy situation, a wound resulting from an injury takes on a painful or unhealthy action; in this case, the best treatment is frequently to give opium freely; local applications, or depletion, as by purgatives, either do no good, or aggravate the mischief.

In *irreducible hernia*, especially when it is large and occurs in old persons, the *free* employment of opium frequently effects reduction spontaneously, even after the failure of persevering efforts by the taxis. It ought to be given to such an extent as to produce sleep, whatever may be the quantity required; and in this state, pain and the consequent irritable constriction being at an end, the hernia frequently returns of itself, the patient being unconscious of it until he awakes. The rule has even been laid down that, in every case of irreducible hernia, we ought to try the effects of the full use of this remedy before operating, unless the symptoms are so urgent as to forbid the delay even of a few hours. For a recent detail of several cases, see Rankin's Abstract, vol. x. p. 155.

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* Liverpool.

Locally, opium is employed, in the form of plaster or liniment, in various cases of local pain, as *bruises* or *chronic rheumatism*. In *neuralgia* it is not nearly so efficacious as belladonna or aconite. In *painful ulcers* an opium lotion is frequently an admirable application. In *chronic ophthalmia*, the vinum opii is sometimes dropped into the eye, and allays the pain and irritability, whilst it acts as a stimulant to the congested vessels. In *spasmodic stricture* and *chordee*, and in *diseases* of the *prostate gland*, and in *dysentery*, an opium suppository is often useful. In *diarrhœa*, and some other diseases in which it may be advisable not to give it by the mouth, it is advantageously administered in an enema. The French consider opium to produce more powerful effects in this way than when taken by the mouth; but English experience does not confirm this, and the dose thus given is usually double the ordinary one. Care must be taken that the *quantity of fluid in the enema is not too large*; two or three ounces, slowly injected, is sufficient; if more than this is used, it will probably be returned.

Dose and administration.—*Small* dose, gr. ⅛ to gr. ss. *Medium*, gr. ss to gr. j or gr. jss. *Full*, gr. ij to gr. v; but much larger doses may sometimes be given. Of the *tincture*, ♏ij to f℥j or f℥ij. The tincture contains about one grain of opium in fifteen minims; hence, ♏ij correspond nearly with gr. ⅐ of solid opium. In enema, about ♏xxx is a medium dose. As a suppository, gr. v may be mixed up with soap. As has been already mentioned, the dose for infants should be exceedingly small, and most carefully watched; under two months of age ⅛ of a drop is as much as is safe, and one drop is a full dose for a child a year old who has not been accustomed to its use. When combined with calomel, it restrains the action of this medicine upon the bowels, and more speedily induces its constitutional effects. Combined with ipecacuanha, it checks its nauseating effects, causes diaphoresis, and has its own effects upon the head diminished in a remarkable degree; similar effects are produced by its combination with tartar-emetic. Tincture of opium and spirit of nitric ether, in equal doses, form an excellent diaphoretic and diuretic mixture, and allay the pain of strangury caused by a blister.

Officinal Preparations and their respective Quantities of Opium.

Confectio Opii - - - -	gr. j in gr. xxx.
Electuarium Catechu - - -	gr. j ,, ʒiij.
,, Opii - - - -	gr. j ,, ℈ij.
Emplastrum Opii - - - -	ʒj ,, ℥jss.
Enema Opii - - - -	♏xxx f℥iv.
Extractum Opii - - - -	
Linimentum Opii - - - -	fʒj ,, f℥iv.
Pilula Saponis co. - - - -	gr. j ,, gr. v.
,, Styracis co. - - - -	gr. j ,, gr. v.
,, Plumbi Opiata - - -	gr. ss ,, gr. iv.
Pulvis Cretæ co. cum Opio - -	gr. j ,, ℈ij.
,, Ipecacuanhæ co. - - -	gr. j ,, gr. x.
,, Kino co. - - - -	gr. j ,, gr. xx.
Tinctura Camphoræ co. - - -	gr. j ,, f℥ss.
,, Opii (about) - - -	gr. j ,, ♏xv.
,, Opii Ammoniata - - -	gr. $\frac{3}{4}$,, fʒj.
Trochisci Morphiæ - - -	gr. $\frac{1}{40}$ each.
,, Morphiæ et Ipecac. - -	gr. $\frac{1}{20}$ each.
,, Opii - - - -	gr. $\frac{1}{4}$ each.
Vinum Opii (about) - - -	gr. j in ♏xv.
Unguentum Opii - - - -	℈j ,, ℥j.

Comparative Doses of principal Narcotics.

Opium - - -	gr. j.	
Salts of Morphia -	gr. ss.	
Solution of Morphia -	♏xxx.	
Acetum Opii - -	♏x *E.*; ♏xxx *D.*	
Tincture of Opium -	♏xv.	
,, Hyoscyamus -	♏xxx.	
,, Aconite -	♏v to ♏x.	
,, Cannabis Indica	♏x to ♏xl.	
,, Conium -	♏xxx	Seldom given when it is important to produce sleep.
,, Lactucarium	♏xl and fʒij.	
Pulvis Ipecacuanhæ co. -	gr. x.	
Extract of Opium -	gr. j.	
,, Hyoscyamus -	gr. iij.	
,, Conium -	gr. iij.	(See remark above.)
,, Lactucarium -	gr. ij to gr. x	Of uncertain strength and effects.
Enema Opii - -	f℥iv.	

TINCTURA OPII AMMONIATA, *E.*

Take of Benzoic acid, and Saffron, chopped, of each, six drachms.
Opium, sliced, half an ounce.
Oil of anise, one drachm.
Spirit of ammonia, two pints.

Digest for seven days, then filter.

Remarks.— One fluid ounce contains gr. vi of opium.

Medicinal properties and uses. — Similar to those of the next preparation.

Dose. — ♏xx contain about gr. ¼, from which the dose may be estimated.

TINCTURA OPII CAMPHORATA, *D.E.*

CAMPHORATED TINCTURE OF OPIUM.

D. Opium, in coarse powder; Benzoic acid, of each, ʒjss; Camphor, ʒj; Oil of anise, fʒj; Proof spirit, Oij.

E. Camphor, ℈ijss; Opium, sliced, Benzoic acid, each, ℈iv; Oil of anise, fʒj; Proof spirit, Oij.

Macerate fourteen (*D.*), seven (*E.*), days, then filter.

Remarks. — One fluid ounce of the Edinburgh tincture contains two grains of opium, and the Dublin tincture contains a trifle more. Both correspond so closely in strength and ingredients with the London compound tincture of camphor, that they may be used indiscriminately.

Uses and dose.—See TINCTURA CAMPHORÆ COMP., p. 737.

TINCTURA QUASSIÆ, *E.*

TINCTURE OF QUASSIA.

Take of Quassia, in chips, ten drachms.
Proof spirit, two pints.

Digest for seven days, and then filter.

Medicinal properties and uses.—Bitter tonic. It may be combined with compounds of iron.

Dose.—♏xv to fʒij.

TINCTURA QUASSIÆ COMPOSITA, *E.*

Take of Cardamom seeds, bruised,
Cochineal, bruised, of each, half an ounce.
Cinnamon, in moderately fine powder,
Quassia, in chips, of each, six drachms.
Raisins, seven ounces.
Proof spirit, two pints.

Digest for seven days, strain; express and filter. If the quassia is rasped or powdered, percolate as directed for Compound Tincture of Cardamoms.

Medicinal properties and uses.—Aromatic; bitter; tonic. It should not be combined with iron, on account of the cinnamon.

Dose.—♏xv to fʒij.

TINCTURA QUINÆ COMPOSITA, *L.*

COMPOUND TINCTURE OF QUININE.

Take of Disulphate of quinine, five drachms and a scruple.
Tincture of orange peel, two pints.

Digest for seven days, or until it is dissolved, and strain.

Remarks.—If the straining is necessary, it shows that a portion of the quinine, the only valuable part of the tincture, is undissolved, and so far wasted. The quantity of quinine ordered, is at least twice as much as the spirit can dissolve; half of it will therefore be thrown away if made according to this formula*; the addition of fʒij of dilute sulphuric acid would overcome the difficulty. It is an aromatic preparation of quinine.

Dose.—fʒj contains gr. j of quinine, from which the dose may be calculated.

TINCTURA RHEI, *E.*

Take of Rhubarb, in moderately fine powder, three ounces and a half.
Cardamom seeds, bruised, half an ounce.
Proof spirit, two pints.

Mix the rhubarb and cardamom seeds, and percolate as directed for Tincture of Cinchona, or digest for seven days.

Properties and uses.—*Purgative* and *carminative.*

Dose.—fʒij to f℥ss.

TINCTURA RHEI COMPOSITA, *L. D.*

COMPOUND TINCTURE OF RHUBARB.

Take of Rhubarb, sliced, two ounces and a half.
Liquorice, fresh bruised, six drachms.
Ginger, bruised,
Saffron, each, three drachms.
Proof spirit, two pints.

Macerate for seven days; then express and strain.

D. Rhubarb, ℥iij; Cardamom seeds, ℥j; Saffron, ʒij; Liquorice root, bruised, ℥ss; Proof spirit, Oij. Macerate fourteen days; strain, express, and filter.

Medicinal uses.—Purgative; stomachic. It is chiefly used as a stimulating aperient in flatulent colic; or as an astringent aperient in the early stage of a colicky diarrhœa. It is sometimes employed in the later stage of diarrhœa.

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* Bastick, Ph. Jour. May, 1851.

Doses.—fʒij to f℥ss.

TINCTURA RHEI ET ALOES, *E.*

TINCTURE OF RHUBARB AND ALOES.

Take of Rhubarb, in moderately fine powder, an ounce and a half.
Aloes (Socotrine, or East Indian), powdered, six drachms.
Cardamom seeds, bruised, five drachms.
Proof spirit, two pints.

Mix the powders, and proceed as for Tincture of Cinchona.

Medicinal properties and uses.—Stimulant purgative; chiefly used by old people.

Dose.—f℥j or more, if taken at once; fʒj or fʒij, if added to purgative mixtures.

TINCTURA RHEI ET GENTIANÆ, *E.*

Take of Rhubarb, in moderately fine powder, two ounces.
Gentian, coarsely powdered, half an ounce.
Proof spirit, two pints.

Mix the powders, and proceed as directed for Tincture of Cinchona.

Properties and uses.—Tonic; bitter; and purgative. (See TINCTURA RHEI COMP.)

Dose.—fʒj to f℥ss, or more.

TINCTURA SCILLÆ, *L.D.E.*

TINCTURE OF SQUILL.

Take of Squill, fresh-dried, five ounces.
Proof spirit, two pints.

Macerate for seven (fourteen, *D.*), days, then strain.

E. Percolate as in Tincture of Cinchona, but without packing the pulp firmly in the percolator.

Medicinal uses.—Expectorant; diuretic. This preparation is not adapted to children, as the spirit excites feverishness, and does more harm than the squill does good.

Dose.—♏x to ♏xxx.

TINCTURA SENNÆ COMPOSITA, *L. D. E.*

Compound Tincture of Senna.

Synonyme. Elixir Salutis.

Take of Senna, three ounces and a half.
Caraway, bruised, three drachms and a half.
Cardamoms, bruised, a drachm.
Raisins, stoned, five ounces.
Proof spirit, two pints.
Macerate for seven days, then strain.

D. Senna, ℥iv; Caraway seeds, Cardamom seeds, of each, ℥ss; Proof spirit, Oij. Macerate for fourteen days.

E. Sugar, ℥ijss; Coriander, ℥j; Senna, ℥iv; Jalap, in moderately fine powder, ʒvi; Caraway and Cardamom seeds, of each, ʒv; Raisins, stoned, ℥iv; Proof spirit, Oij. Digest for seven days; strain, express, and filter: or percolate, as directed for Tinct. Cardam. comp. If Alexandrian senna is used, it must be freed from cynanchum leaves by picking.

Properties.—Stomachic; purgative. The Edinburgh tincture is the strongest, from containing jalap.

Dose.—fʒj to fʒij, if added to purgative mixtures; f℥ss to f℥j, if taken alone.

TINCTURA SERPENTARIÆ, *L. E.*

Tincture of Serpentary.

Take of Serpentary, bruised, three ounces and a half.
Proof spirit, two pints.
Macerate for seven days; then express and filter.

E. Serpentary, ℥iij; Cochineal, ʒj; Proof spirit, Oij. Proceed as for Tincture of Cinchona.

Remarks.—The Edinburgh tincture differs from the London in colour, but the preparation is a very unimportant one altogether.

Medicinal uses.—Stimulant, tonic, and diaphoretic. Dose, fʒss to fʒij.

TINCTURA STRAMONII, *D.*

Tincture of (Thornapple) Stramonium

Take of Stramonium seeds, bruised, five ounces.
Proof spirit, two pints.
Macerate for fourteen days; strain, express, and filter.

Properties.—Sedative. Very seldom employed.

Dose.—♏xv to ♏xxx, or more, according to its effects

TINCTURA SUMBUL. (Savory's.* Not Off.)

TINCTURE OF SUMBUL.

Take of Sumbul root, bruised, four ounces.
Rectified spirit, twenty-four fluid ounces.
Water, nine fluid ounces.
Digest fourteen days, and filter.

Properties and uses.—See SUMBUL, below.
Dose.—♏xl to f℥j, or f℥iss.

TINCTURA SUMBUL ETHEREA. (Savory's.)

ETHEREAL TINCTURE OF SUMBUL.

Take of Sumbul root, bruised, nine ounces.
Rectified ether, ninety-six fluid ounces.
Digest for fourteen days, and filter.

Remark.—This tincture is more suited for flatulent hysterical fits than the simple tincture, the ether acting as an antispasmodic, and aiding the effect of the Sumbul.
Dose.—♏xxv to ♏xl.

SUMBUL. (Plant unknown. Umbelliferous.)

Description.—Sumbul root has been brought into this country from Russia and from Bombay. It is said to resemble inferior rhubarb, but the specimens which I have seen are much more like very large samples of Calumba root, being circular and slightly marked by rings, not unlike those seen in that root. It has a peculiar odour of musk, and a slightly bitter taste.

Composition.—*Volatile oil.* Two kinds of *resin*, soluble in ether and alcohol, and a minute quantity of a crystallisable substance, to which the name of *Sumbulic acid* has been given.

Medicinal properties and uses.—Sumbul was introduced as a *stimulant tonic* or *antispasmodic*, and as peculiarly useful in *epilepsy and hysteria*. As a *general tonic*, I do not imagine that it possesses any particular advantages over those with which we have been long acquainted. "It does well enough to ring the changes upon, and it never does any harm, however long you use it," was the account given to me by a physician who had used it extensively; and all the information I have received, tends to the same result. But in the treatment of *epilepsy*, I am disposed to give it a much higher rank. The published accounts of its effects are not at present numerous, but Dr. Boyd, of the Somerset County Lunatic Asylum, in the report for 1850, says, that it mitigates the severity of epileptic fits in lunatic patients*, and such a number of manuscript cases have been forwarded to me by Messrs. Savory, as entitle it to a fair and extended trial in this usually intractable disease. Two cases are not sufficient to prove any thing definitely, and I have only fairly tested it in two instances. One of these was a woman aged about twenty-five years, who had had epileptic fits for ten years. During this time she had occasional intervals of freedom for three weeks at a time, but never longer. Before I administered the Sumbul she had had several fits every day for many weeks without interruption. I gave her ♏xl of the tincture three times a day, making no change in her diet or other regimen. The fits ceased for five weeks, when she had a single one, but she has had no return now after an interval of about three months. In this instance the improvement has been so sudden and striking, as to suggest the fear that it may prove an exceptional case, and that equal benefit must not be looked for in general. The other case was that of a young woman aged twenty years, in the seventh month of pregnancy, who had chorea of the most severe and alarming character. I have seen three fatal cases in persons about her age, in whom the choreatic movements were not more violent or incessant than in her — and I was in fear of a fatal result in her case also. The urgency of the symptoms appeared too great to allow of experimental treatment, and I diligently pursued such plans as are most recognised in general practice, but with scarcely any improvement. I then commenced giving the tincture of sumbul in forty minim doses three times a day. For a few days, the improvement, if any, was slight, but in less than a week all the unfavourable symptoms had considerably abated, and in less than a month, she was entirely free from the chorea. In such cases, therefore, as far as my inquiries and experience extend at present, the remedy holds out the prospect of being a valuable one.

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* This is not *precisely* the form employed by Messrs. Savory, as their measure is the old wine pint. Their exact formula is—Sumbul, 64 oz.; Spirit. Vini, 23 pints o. m.; Water, 9 pints o. m. They also prepare an "Alcoholic Tincture," which is made without water at all; but I have not introduced it, because it is not the same strength, whilst the two names are so closely alike that confusion would be very likely to arise between them.

Dose. — Of the tincture, ♏xl, gradually increased to f℥j or even f℥iss, two or three times a day. Of an *Infusion* (made with ℥ss of the bruised root, to f℥viij of water) f℥ss to f℥j, three times a day.

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* In a private letter (June 13, 1854), Dr. Boyd still speaks favourably of sumbul, though he adds, "Many have taken it here without any benefit;" which is not surprising in the epilepsy of lunatics.

TINCTURA TOLUTANA, *L.D.E.*

TINCTURE OF TOLU.

Synonyme. Tinctura Balsami Tolutani. *Ph. L.* 1836.

Take of Balsam of Tolu, two ounces.
Rectified spirit, two pints (Oj, *D.*).
Macerate until the balsam is dissolved, and strain.

E. Balsam of Tolu, ℥iijss; Rectified spirit, Oij. Digest the balsam in the spirit, with a gentle heat, till it is dissolved.

Remarks.—Both the Edinburgh and Dublin tinctures are about twice as strong as that of London.

Properties.—*Stimulant expectorant*, checking excessive mucous secretion in chronic bronchitis in old people. When about to be mixed with water, it must be triturated with *treacle*, not mucilage.

Dose.—♏xv to ♏xxx.

TINCTURA VALERIANÆ, *L.D.E.*

TINCTURE OF VALERIAN.

Take of Valerian, bruised, five ounces.
Proof spirit, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

E. Proceed as for Tincture of Cinchona.

Medicinal properties and uses.—*Antispasmodic.* It is less powerful than the compound tincture, but is very useful, when combined with tincture of muriate of iron, in the flatulent debility of women, and in hysteria. It is often added to the infusion of valerian. (See TINCT. VALERIANÆ CO.)

Dose.—♏xxx to f℥j.

TINCTURA VALERIANÆ AMMONIATA, *E.*

Take of Valerian, bruised, ℥v; Spirit of ammonia, Oij.
Proceed as for Tincture of Cinchona.

Dose.—♏xxx.

TINCTURA VALERIANÆ COMPOSITA, *L.E.*

COMPOUND TINCTURE OF VALERIAN.

Take of Valerian, bruised, five ounces.
Aromatic spirit of ammonia, two pints.
Macerate for seven days; then express and filter.

VALERIANA OFFICINALIS (Triandria Monogynia; Valerianaceæ).

Description.—Valerian root consists of a number of short twis fibres, of a yellow or yellowish-brown colour, which appear as i not very highly dried, and have a peculiar and, to most peopl very offensive odour, resembling that of a cat's urine.

The roots of valerian growing in marshy places, or on the ba of rivers, are inert (*Neligan*).

Root for which it may be mistaken.—Serpentary. The fibres o serpentary root are thinner, generally longer, of a grey and not o a yellow colour, and its odour is peculiar, and very different fro that of valerian.

Composition.—*Volatile oil; valerianic acid*, which is volatile, an resembles oil; and *resin*.

Medicinal properties.—*Antispasmodic* and *stimulant*. In som cases it excites the nervous system, causing giddiness, restlessnes and agitation, and hurry of the spirits. In large doses it cause nausea. Its effects upon the circulation are by no means unifor Its taste is very nauseous. It is said that cats are very fond of i and that when under its influence, they roll themselves upon th ground in outrageous playfulness.

Uses.—In *epilepsy*, with uncertain good effects. In *hysteria* an *hypochondriasis* it has often been very beneficial. In the acu pains which sometimes occur suddenly in hysteria, the compoun tincture, combined with an equal quantity of tincture of hyoscya mus, is often very useful. This tincture is more powerful than th last, owing to the presence of the ammonia; but it is incompatib with the muriated tincture of iron, the iron of which is precipitat by the ammonia; hence, in many cases, the simple tincture is th more valuable preparation.

Dose.—♏xxx to f℥j.

TINCTURA ZINGIBERIS, *L. D. E.*

TINCTURE OF GINGER.

Take of Ginger, bruised, two ounces and a half (℥vii *D.*).
Rectified spirit, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

E. Proceed as for Tincture of Cinchona.

Remark.—The Dublin tincture is about three times the strengt of the London and Edinburgh tinctures.

ZINGIBER OFFICINALIS (Monandria Monogynia; Zingiberaceæ).

Description.—Ginger is not naturally so white as it is generall seen in the shops. When the rhizomes have been dug up, th bark is carefully scraped off, and they are afterwards bleached by exposure to the fumes of burning sulphur, or by washing in a solution of chloride of lime.

Composition. — Volatile oil, and soft resin.

Medicinal properties.— *Acrid aromatic; stimulant;* and *sialogogue.* When made into a paste with water, and laid upon the skin, ginger produces considerable irritation and redness; when chewed, it excites the flow of saliva. Its powder causes sneezing, and irritates the mucous membranes, generally, when topically applied. It is frequently introduced by horse dealers into the rectum of a horse, before it is offered for sale; the severe pain makes the animal incessantly move about, and gives him an unnatural appearance of vivacity.

Uses. — As a condiment. Chiefly as an adjunct to tonics, or to correct the flavour or griping properties of other medicines. It is a useful carminative in flatulence. It is much employed in the form of ginger beer. It is sometimes chewed to relieve toothache; and a plaster made of the powder, moistened with brandy and applied to the forehead, often cures violent headaches.

Uses. — Of the powder, gr. v to ℈j, or ʒss; of the tincture, fʒss to fʒj.

TROCHISCI, *E.*

TROCHES. LOZENGES.

TROCHISCI ACACIÆ.

GUM LOZENGES.

Gum-arabic, ℥iv; Starch, ℥j; Pure sugar, ℔j.

Mix and pulverise them, and make them into a proper mass with rose water, for forming lozenges.

Uses.—*Demulcent* in tickling coughs.

Dose.—Ad libitum.

TROCHISCI ACIDI TARTARICI.

TARTARIC ACID LOZENGES.

Tartaric acid, ʒij; Pure sugar, ℥viii; Volatile oil of lemons, ♏x.

Pulverise the sugar and acid; add the oil; mix them thoroughly, and beat them into a proper mass with mucilage.

Uses.—An officinal form of "acid drops." *Refrigerant* in febrile attacks.

Dose.—Almost *ad libitum.*

TROCHISCI CRETÆ.

CHALK LOZENGES.

Prepared chalk, ℥iv; Gum-arabic, ℥j; Nutmeg, ʒj; Pure sugar, ℥vi.

Reduce them to powder and beat them with a little water into a proper mass.

Uses.—*Astringent* in chronic diarrhœa.

Dose.—Ad libitum.

TROCHISCI GLYCIRRHIZÆ.

LIQUORICE LOZENGES.

Extract of Liquorice and Gum-arabic, of each, ℥vi; Pure sugar, ℔j.

Dissolve them in a sufficiency of boiling water, and then concentrate the solution over the vapour-bath to a proper consistence for making lozenges.

Uses.—Demulcent in tickling coughs.

Dose.—Ad libitum.

TROCHISCI LACTUCARII.

Lactucarium Lozenges.

To be prepared with Lactucarium in the same proportion and in the same manner as the Opium Lozenges.

Uses. — *Sedative* in irritable coughs. They are less liable to disorder the stomach, or excite headache or constipation, than the opium lozenges.

Dose. — Each lozenge contains gr. $\frac{1}{4}$ of lactucarium, and they may be taken almost *ad libitum.*

TROCHISCI MAGNESIÆ.

Magnesia Lozenges.

Carbonate of magnesia, ʒvi; Pure sugar, ℥iij; Nutmeg, ℈j.

Pulverise them; and, with mucilage of tragacanth, beat them into a proper mass.

Uses. — *Antacid* and *laxative.* For children with acidity of the stomach and bowels occasioning griping.

Dose. — Lozenges of the ordinary size contain about eight or ten grains of magnesia, whence the dose must be estimated.

TROCHISCI MORPHIÆ.

Morphia Lozenges.

Muriate of morphia, ℈j; Tincture of Tolu, f℥ss; Pure sugar, ℥xxv.

Dissolve the muriate of morphia in a little hot water; mix it and the tincture of Tolu with the sugar, and with a sufficiency of mucilage form a proper mass for making lozenges, each of which should weigh about fifteen grains.

Uses. — *Sedative* in any case in which morphia is applicable.

Dose.—Each lozenge contains about gr. $\frac{1}{40}$ of muriate of morphia.

TROCHISCI MORPHIÆ ET IPECACUANHÆ.

Morphia and Ipecacuanha Lozenges.

Muriate of morphia, ℈j; Ipecacuanha, in fine powder, ʒj; Tincture of Tolu, f℥ss; Pure sugar, ℥xxv.

Proceed as directed above for the Morphia Lozenges.

Uses. — These are valuable cough lozenges, and the addition of the ipecacuanha confines them to this purpose. If taken in excess they cause nausea.

Dose. — One lozenge, three or four times a day, or according to the effect produced. Each lozenge contains about gr. $\frac{1}{40}$ of muriate of morphia, and gr. $\frac{1}{12}$ of ipecacuanha.

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TROCH

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Uses. — *Antacid* ;

UNGUENTA.

OINTMENTS.

Remarks. — Ointments differ from cerates chiefly in being softer, which is occasioned by the smaller quantity of wax, and the substitution of lard for this ingredient. They are more liable to become rancid, if kept long, or in a hot place.

UNGUENTUM ÆRUGINIS, *E.*

Verdigris Ointment.

Take of Resin ointment, fifteen ounces.
Verdigris, in fine powder, one ounce.

Melt the ointment, sprinkle into it the powder of verdigris, and stir the mixture briskly as it cools and concretes.

Properties and uses. — It is a stimulating, detergent ointment to languid or unhealthy sores.

UNGUENTUM AMMONIÆ EPISPASTICUM. (Gondret.)

Caustic Ammoniacal Ointment. (Gondret's. Not Off.)

Take of Suet and Lard, of each, one ounce.
Strong solution of ammonia, two ounces and a half.

Melt the suet and lard together in a wide-mouthed stoppered bottle, and when barely fluid add the ammonia and shake them well together, frequently withdrawing the stopper for a moment. When this mixture is solid it is fit for use.

Employment. — When spread pretty thickly upon the skin, and covered over, it produces a blister in from ten minutes to half an hour.

UNGUENTUM ANTIMONII POTASSIO-TARTRATIS, *L. D. E.*

Tartar-emetic Ointment.

Synonyme. Unguentum Antimonii Tartarizati, *D.* Unguentum Antimoniale, *E.*

Take of Potassio-tartrate of antimony, rubbed to a very fine powder, one ounce, *L. E.*
Lard, four ounces, *L. E.*

Rub them together.

D. Tartar-emetic, ʒi; Ointment of white wax, ʒvii.

Medicinal properties. — This ointment produces inflammation o the skin, and a pustular eruption, which is sometimes very sever The pustules are generally large and deep; not numerous, bu frequently attended with great irritation. If ten or fifteen drop of croton oil are added to half an ounce of this ointment, an the quantity of the tartar-emetic is a little diminished, or eve left the same, the pustules are more numerous, less deep, an smaller, and attended with less pain. The same effect may b produced by adding ♏xx or ♏xxx of strong sulphuric acid t half an ounce of the ointment. This entirely changes its appearanc and character, as it acquires a deep orange or red colour. Th length of time requisite to obtain these effects varies, accordin to the nature of the skin. Sometimes two or three application cause a copious eruption of pustules, but occasionally it require diligent use for several successive evenings. I knew one instanc in which a single application was followed by sloughing tha nearly killed the patient: but such a case as this cannot b anticipated, and ought not to interfere with our practice, excep to make us cautious in watching its effects, when the patient i much debilitated by fever or other disease.

Uses. — Its uses are those of a counter-irritant generally, an are therefore very numerous. From the slowness of its action i cannot be used in any acute case; and it is only employed i chronic affections, in which long continued counter-irritation i required. In the *short dry cough*, or cough accompanied by slight expectoration, which is sometimes very persistent, but unaccompanied by any appreciable organic change, the use of th ointment for many weeks, beneath the clavicles, or in front of th trachea, is often the most efficient treatment, and probably caus the removal of the thickened state of the mucous membrane, whic may be dependent upon some degree of chronic bronchitis. I *incipient phthysis* it is rubbed under the clavicles; but does n generally produce such good effects as are said to follow the employment of the acetic acid and turpentine embrocation, spoken under the article Acetic Acid, p. 73. In *chronic thickening*, *chronic inflammation of the joints*, in *chronic peritonitis*, in *chron gastritis*, rubbed upon the epigastrium. In chronic *pericarditis*. *is desirable not to apply tartar-emetic ointment to any part which usually seen*, as there will probably be a scar from the pustul though this does not always remain.

Mode of employment. — It should be rubbed pretty strongly, b means of a piece of flannel. Half a drachm may be sufficient begin with, and it should be used every evening, or twice a da until the eruption appears; after which it must be continued quantity and frequency proportioned to the effect produced.

UNGUENTUM ARSENICI TERIODIDI. (Not Off.)

OINTMENT OF (TER) IODIDE OF ARSENIC. (Biett's.)

Take of Teriodide of arsenic, two grains and a half.
Lard, an ounce.
Mix.

Uses. — As an external application to cancerous tumours. One drachm may be used at a time. See ARSEN. TERIOD. p. 412.

UNGUENTUM BELLADONNÆ, *L.*

BELLADONNA OINTMENT.

Take of Extract of belladonna, a drachm.
Lard, an ounce.
Rub them together.

Properties and uses. — This ointment is very seldom used. It is anodyne, and may be applied to painful ulcers, or it may be rubbed round the eye to cause dilatation of the pupil; or upon a joint painful from rheumatism.

UNGUENTUM CANTHARIDIS, *L. D. E.*

OINTMENT OF CANTHARIDES.

Synonyme. Unguentum Lyttæ.

Take of Cantharides, rubbed to a very fine powder, three ounces.
Distilled water, twelve fluid ounces
Resin cerate, a pound.

Boil down the water with the cantharides, to half, and strain. Mix the cerate with the strained liquor; afterwards let it evaporate to a proper consistence.

D. Liniment of Spanish flies, f℥viii; White wax, ℥iij; Spermaceti, ℥j. Melt them all together, and stir till they are cold.
E. Resin ointment, ℥vii; Cantharides, powdered, ℥j. Melt the ointment, sprinkle in the flies, and stir till they are cold.

Uses. — This ointment is employed to keep open a blister; which it often fails to do.

UNGUENTUM INFUSI CANTHARIDIS, *E.*

OINTMENT OF INFUSION OF CANTHARIDES.

Take of Cantharides, Resin, and Bees'-wax, of each, one ounce.
Venice turpentine, and Axunge, of each, two ounces.
Boiling water, five fluid ounces.

Infuse the cantharides in the water for one night; squeeze strongly, and filter the expressed liquid; add the axunge (lard), and boil till the water is dispersed; then add the wax and resin; and, when these have become liquid, remove the vessel from the fire, add the turpentine, and mix the whole thoroughly.

Uses. — The same as those of the simple ointment, but this is more stimulating and less irritating.

UNGUENTUM CERÆ ALBÆ, *D.*

White Wax Ointment.

Take of White wax, one pound.
Prepared lard, four pounds.
Melt them together, and stir till cold.

Uses. — Simple emollient ointment.

UNGUENTUM CETACEI, *L. D.*

Spermaceti Ointment.

Take of Spermaceti, five ounces.
White wax, fourteen drachms.
Olive oil, a pint, or sufficient.

Being melted together with a slow fire, stir constantly until they become cold.

D. Spermaceti, ℔j; White wax, ℔ss; Lard, ℔iij. Melt together.

Medicinal use. — There is no difference in the properties of this and the ceratum cetacei, excepting that the ointment is softer. They are used for similar purposes.

UNGUENTUM CITRINUM, *E.*

Citrine Ointment.

Take of Pure nitric acid, eight fluid ounces, and six fluid drachms.
Mercury, four ounces.
Axunge (lard), fifteen ounces.
Olive oil, thirty-two fluid ounces.

Dissolve the mercury in the acid, with the aid of a gentle heat; melt the axunge in the oil, with the aid of a moderate heat, in a vessel capable of holding six times the quantity; and while the mixture is hot, add the solution of mercury, also hot, and mix them thoroughly. If the mixture does not froth up, increase the heat a little till this takes place. Keep this ointment in earthenware vessels, or in glass vessels secluded from the light.

Preparation, properties, and uses. — See Unguentum Hydrarg. Nitratis, p. 805.

UNGUENTUM COCCULI, *E.*

Ointment of Cocculus Indicus.

Take any convenient quantity of cocculus Indicus, separate and preserve the kernels, beat them well in a mortar, first alone, and then with a little axunge, and then add axunge till it amounts altogether to five times the weight of the kernels.

Uses. — It is chiefly used to kill lice, and sometimes, also, in obstinate porrigo.

COCCULUS, *D. E.*, Anamirta Cocculus (Diœcia Monadelphia; Menispermaceæ). The Fruit.

Description. — The fruit is round, and consists of a dry, thin, hard, blackish-brown outer shell, within which the seed is firmly retained in its position by the placenta, which nearly divides the interior into two portions. The seed, which is oily, is always shrunk so as only to fill about two-thirds of the outer case.

Fruit for which it may be mistaken. — Bay berries, which it very closely resembles in appearance; it is not quite so large, and whilst the seed is always loose and rattles in the bay berry, which it nearly fills, it is always fast in the cocculus, and only fills the shell about two-thirds.

Composition. — Cocculus Indicus contains an intensely bitter, crystalline substance termed *picrotoxine*, on which its poisonous properties depend; also gum and resin.

Medicinal properties and uses. — Cocculus is seldom used medicinally, except to kill lice. It causes nausea, giddiness, and symptoms resembling intoxication, owing to which property it is extensively used to adulterate beer, notwithstanding the heavy penalties inflicted by the excise when this fraud is discovered. There is no known antidote for a poisonous dose; vomiting should be excited as quickly as possible.

UNGUENTUM CONII, *L.*

Ointment of Hemlock (Conium).

Take of Conium (leaves), fresh,
Lard, of each, a pound.

Boil the conium with the lard till it becomes friable; then express through linen.

Properties. — A valuable anodyne soothing ointment to painful or cancerous sores.

UNGUENTUM CREASOTI, *L. D. E.*

CREASOTE OINTMENT.

Take of Creasote, half a fluid drachm.
Lard, an ounce.
Rub them together.

D. Creasote, fʒj; White wax ointment, ʒvii.
E. Creasote, fʒj; Axunge (lard), ℥iij.

CREASOTE.

Process for obtaining creasote.—When wood is submitted to high temperature, it is decomposed, and an impure acetic acid (pyroligneous) is distilled over, as well as an impure oil, which is heavier than water. This oil contains creasote, and several other compounds, viz. *paraffine*, *eupione*, *picamar*, *capnomor*, and *pittacal*, together with some *acetic acid*, *ammonia*, and *organic matter*. By digestion with carbonate of potash, and afterwards with phosphoric acid, the acetic acid and ammonia are neutralised, and the impure creasote is separated by distillation. It is then digested with solution of potash, which combines with it, and separates it from its accompanying impurities. It is afterwards separated from the potash by the addition of dilute sulphuric acid, and is obtained pure by distillation (*Turner's Chemistry*).

Properties. — Creasote is a transparent liquid, of a thin, oily consistence, and generally has a slight yellow tinge. Its smell is strong and peculiar, resembling that of smoked meat. It has a burning taste, followed by sweetness. Its sp. gr. is 1·037. It boils at 397° F., and, when inflamed, burns with a very sooty flame. It is soluble in eighty parts of water, and dissolves in every proportion in alcohol, ether, acetic acid, and naphtha. It is neither acid nor alkaline, itself, but combines readily with both classes of bodies. It is highly preservative to meat, and the antiseptic properties of tar, smoke, and impure pyroligneous acid appear to be owing to its presence. It instantly kills insects and fish, and coagulates albumen in eggs and blood.

Composition. — Undetermined; it consists of carbon, hydrogen, and oxygen.

Medicinal properties. — Creasote was at one time considered almost a panacea, but its value is now better known, and is more moderately estimated. It is *irritant*, *narcotic*, *anodyne*, and *styptic*. In *large* doses (♏xxx) it kills rabbits, and causes headache in human beings; it causes vomiting, and sometimes diarrhœa; and occasionally increases the flow of urine. In *moderate* doses (♏j to ♏iij) it allays vomiting more effectually than almost any substance with which we are acquainted. When applied locally, in the concentrated state, it removes the cuticle; in a dilute form it arrests hæmorrhages, by coagulating the albumen of the blood.

It corrects the fœtor, and improves the character of foul indolent ulcers, and stimulates the granulating surface of large sores, as those from burns, to a healthy action; applied in its concentrated state to the interior of a carious tooth, which has been previously cleaned, it allays the pain without exciting increased suffering in the first instance. It is absorbed into the system, and is exhaled by the breath, as well as evacuated by the urine, which it sometimes renders dark coloured. A case is reported by Mr. Jeffery[*], in which a woman swallowed a piece of lint soaked with creasote, which she intended to have put into a carious tooth. In a few minutes she felt depressed, and lost her eyesight, everything first appearing blue. Great heat in the chest and burning thirst. She afterwards vomited repeatedly, and became insensible, with dilated pupils, and perfect unconsciousness, so that her tooth was extracted without her knowing it; under the administration of carbonate of ammonia she revived; but headache and dilatation of the pupils with disordered vision continued for several days.

Uses. — *Internally*, to *allay vomiting*, whether dependent upon *organic* disease of the *stomach*, *liver*, or *kidneys*, or upon *functional derangement*. It is highly useful in the *chronic vomiting* of *utero-gestation*, and of *hysteria*. In *diarrhœa*, whether of infants or adults, either *epidemic*, or *remaining after the too powerful action of purgatives*, or when there are *frequent, sudden liquid painless evacuations* continuing after an acute diarrhœa, creasote is reported to have proved serviceable by Mr. Spinks and Mr. Richardson. If it produces a dry white tongue and feverishness it must be discontinued. Dose in these cases, gtt. ⅛ to ¼ under two years of age; ♏j to ♏ij for adults.[†] It has been used in *diabetes*, but does not deserve any confidence in this disease. *Externally*, in lepra, psoriasis, and some other scaly diseases, and in *lupus* and *noli-me-tangere*. In *caries* of *bones*, and in carious *toothache*, in *foul* and *indolent ulcers*; in *hæmorrhages*, in *chronic ophthalmia*, and in *chronic gonorrhœa*. It has been used by way of inhalation for the relief of *dyspnœa* and *excessive mucous secretion*, both in bronchitis and phthysis, with decided benefit in many cases. Dr. Inman has described the conditions which he finds most useful, viz., "the temperature of the water is not to exceed 150°, and the quantity should not be above a pint, or a pint and a half. From four to ten drops of creasote should be dropped into it, and the *tube of the inhaler should be large*."[‡] If a towel is rolled round the mouth of a common quart jug, and the face held within it, the necessity for an inhaler may be dispensed with.

It has been used for many years with success by Dr. Fahnestock of St. Petersburgh, in the treatment of *erysipelas* of the face and other parts. He paints it over the whole of the affected parts by means of a camel's hair pencil, extending it beyond the margin of the inflammation, and applies no other local treatment. It require reapplication. It does not produce any discolouratio the skin, even if frequently applied.*

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[*] Ass. Med. Jour. Oct. 1853, p. 929.

[†] Braith. Retrosp. vol. xxiv. p. 130.

[‡] Ibid. vol. xxviii. p. 106.

Dose and administration.—For internal use, the dose is cautiously increased; sometimes as much as ♏xx to f℥j h been taken. It may be given in the form of pill; or of mixt diffused through water by means of mucilage. In all the case which it is used externally, except for toothache, lupus, and noli-tangere, it should be used in the form of ointment, or of lo composed of ♏ij to ♏vi dissolved in f℥j of water, by the of mucilage or a few drops of acetic acid. In the excepted c it should be applied in its concentrated form by means of a p of cotton-wool, or by a camel's hair pencil.

PETROLEUM (Barbadoes tar) is a spontaneous exuda from the earth in some countries, and in Barbadoes, and some ot places, it collects in large quantities upon the surface of la It consists chiefly of carbon and hydrogen, and appears to be result of vegetable decomposition, as its components are simila those produced by the destructive distillation of wood. It i dark, almost black, tarry-looking substance, somewhat thicker t treacle, and possessing a peculiar odour.

Uses.—Petroleum is now scarcely ever used, and is seldom k by druggists. Its uses in lepra and other scaly diseases similar to those of tar. In Germany it has been extolled as anthelmintic, but it is never used for that purpose in this count

Dose.—Gr. v to gr. x, or ʒss. Chiefly used in the form ointment.

UNGUENTUM CUPRI SUBACETATIS, *D.*

OINTMENT OF SUBACETATE OF COPPER.

Synonyme. Unguentum Æruginis.

Take of Prepared subacetate of copper, half a drachm.
Ointment of white wax, seven drachms and a half.

Triturate the subacetate of copper with the ointment until t are intimately mixed.

Properties and uses.—See UNGUENT. ÆRUGINIS, p. 793.

UNGUENTUM ELEMI, *L. D.*

OINTMENT OF ELEMI.

Take of Elemi, three ounces.
Turpentine, three ounces and a half.
Suet, six ounces.
Olive oil, half a fluid ounce.

Melt the elemi together with the suet; then rem them from the fire, and immediately mix them with the turpentine and oil; afterwards press through a linen cloth.

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* Ranking's Abst. vol. viii. p. 259.

D. Resin of elemi, ℥iv; Ointment of white wax, ℔j. Melt; strain through flannel, and stir till cold.

Remarks.—There is considerable doubt as to the tree which yields elemi, and different samples of the genuine drug differ much from one another. A considerable portion of what is sold as elemi is fictitious.

Elemi somewhat resembles frankincense; and I have seen specimens of elemi, sagapenum, and galbanum, which could not be distinguished from each other, except by their odour.

Elemi has an agreeable terebinthinate odour, and possesses stimulant properties. It is never used internally. The ointment is applied as a stimulant to old indolent ulcers, and to promote suppuration from setons and issues.

UNGUENTUM GALLÆ, *D.*

GALL OINTMENT.

Take of Galls, in very fine powder, one drachm.
Ointment of white wax, seven drachms.

Rub the powdered galls with the ointment until a uniform mixture is obtained.

Remarks.—This ointment is simply astringent, and does not correspond with the compound gall ointment of the Phs. L. and Ed., which is soothing in addition, from the presence of opium.

Uses.—It is only used for piles.

UNGUENTUM GALLÆ COMPOSITUM, *L.E.*

COMPOUND GALL OINTMENT.

Synonyme. Unguentum Gallæ et Opii, *E.*

Take of Galls, very finely powdered, six drachms.
Lard, six ounces.
Opium, powdered, a drachm and a half.

Rub them together.

E. Galls, ʒij; Opium, ʒj; Axunge, ℥j.

Medicinal use.—*Astringent* and *anodyne.* Used in hæmorrhoidal affections.

UNGUENTUM HYDRARGYRI, *L. D. E.*

MERCURIAL OINTMENT.

Synonyme. Unguentum Hydrargyri Fortius, *Ph. L.* 1836.

Take of Mercury, a pound.
Lard, eleven ounces and a half,
Suet, half an ounce.

First rub the mercury with the suet and a little of the lard, until globules can no longer be seen; then add what is left of the lard, and rub them together.

D. Mercury and prepared lard, of each, ℔j. Proceed as above.

Process.—Many contrivances have been adopted to promote the "killing" of the mercury. The only one which is justifiable, as not changing the character of the result, is the employment of a little old ointment or lard, which has become rancid. If this is rubbed with the fresh mercury, added in small quantities at a time to the lard, the process is completed in less time than is otherwise required. Dr. Christison states that, even under these circumstances, it requires many weeks for its complete extinction, though when made by machinery on a large scale, it is generally finished in twelve hours; the lard being kept fluid at 100° F. the whole time. Guibort explains the efficiency of old ointment or rancid lard, on electrical principles: when mercury and lard are rubbed together, they assume opposite electrical states, and their combination is the result. When the ointment or lard has been exposed to air, so as to become acid (rancid), it is more powerfully negative than before, and renders the mercury more highly positive, and their union takes place therefore more quickly. He states that, in accordance with this supposition, a mortar made of wood or stone is more efficaciously employed for this purpose than one made of metal, which more rapidly conducts away the electricity.*

If sulphur, or turpentine, has been used to promote the extinction of the metal, it may be detected by the odour, when a small portion is heated on a piece of paper, held over the flame of a candle (*Thomson*).

Composition.—This ointment contains half its weight of mercury. It is much disputed in what state the metal exists in this compound. It is agreed on all hands that nearly the whole is simply in a finely divided metallic state; but Christison has found, in every instance which he has examined, that he could not separate the mercury from the ointment, when melted, so perfectly that sulphuretted hydrogen should not produce a deep black colour in the clear melted lard. Now, as this gas does not blacken metallic mercury, it shows the presence of some oxide in the ointment; the quantity is, however, so small, that he only calculates it at one per cent. in the ointment.

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* Quoted by Pereira

Mr. Donovan, of Dublin, long since proposed the substitution of an ointment composed of black (protoxide) mercury, triturated with lard for two hours, at a temperature of 350° F., by which he finds that twenty-one grains are dissolved by each ounce of lard, and a preparation is obtained which is equally efficient with the common ointment in producing mercurial salivation, and accomplishes it in one third the time.

Properties.—Mercurial ointment has a blue colour, and a peculiar odour. Its sp. gr. varies between 1·66 and 1·78. When examined under a microscope of four powers, no globules ought to be visible (*E.*); but when examined under a high power, it is full of innumerable minute globules. It ought not to have a black colour, as this indicates that sulphur has been used in its preparation.

It should be kept in a warm place, as in a cold room the mercury separates from the frozen lard and falls to the bottom.

Medicinal properties.—When taken *internally*, in doses of three to five grains several times in the day, it is said to excite salivation more quickly than almost any preparation of mercury; and it is frequently used for this purpose in Germany; but it is seldom employed in this manner in Britain, though it may deserve a trial. When rubbed *externally* upon the skin, it causes little or no local effect, unless the ointment has become rancid, but it is absorbed into the system, and produces the same general effects which are caused by the internal exhibition of mercurial preparations, with this advantage, that it is not so liable to disorder the bowels or occasion local injury to the mouth. It acts beneficially when applied as a dressing to some languid syphilitic ulcers; and when mixed with camphor, is a valuable dressing for very chronic ulcers of a non-syphilitic character.

Uses.—All cases in which the constitutional effects of mercury are required. *Fever* and *acute inflammations*, especially of *serous membranes*. *Syphilitic* affections requiring the active use of this remedy. As a dressing in *syphilitic ulcers*, which are not of a spreading character. For chronic indolent ulcers with thick callous edges, it often forms a valuable dressing, causing absorption of the edges and consequent cicatrisation. In *hepatic inflammation* or *congestion*, it is rubbed over the region of the liver; and it is rubbed locally upon various *chronic non-malignant tumours*, and chronically *enlarged glands*, to produce their resolution. In *erysipelas*, especially of the *face*, it is highly beneficial; it should be mixed with two or three parts of lard, and then smeared pretty thickly, three or four times a day, over the whole *erysipelatous surface*; it abates the burning pain, and the swelling subsides materially within twenty-four hours; suppuration seldom takes place. It is sometimes applied to the scalp to *kill lice*, and is an invaluable application to chronic *porrigo* and *impetigo* of the scalp.

Administration and dose.—*Internally*, gr. iij to gr. v, with some dry powder; to the extent of ℈j or ʒss in the day, if speedy salivation is required. *Externally*, ʒss may be rubbed upon any part covered with thin skin, as in the inside of the thighs or the axillæ, every hour, if speedy effect is wished for; or ʒj, night and morning, in less urgent cases. Sometimes it is sufficient to fasten ʒss or ʒj into the axillæ of a patient who has fever, for instance, and allow it to be gradually absorbed without friction. If it is very difficult to affect the system through the skin, it has been proposed to rub gr. x or ℈j upon the inside of the cheeks; and the effect is much more speedy in this way. It is desirable that the patient should himself rub it in; but if another person does it, the hand should be covered with oiled silk or soft leather, and the room should be warm, as the ointment is naturally stiff.

UNGUENTUM HYDRARGYRI AMMONIO-CHLORIDI, *L.*

OINTMENT OF AMMONIO-CHLORIDE OF MERCURY.

Synonyme. Unguentum Hydrargyri Præcipitati Albi. White Precipitate Ointment.

Take of Ammonio-chloride of mercury, two drachms.
Lard, three ounces.

Add the ammonio-chloride to the lard, and rub them together.

Medicinal uses.—*Stimulant* and *detergent*. It is used for porrigo and impetigo of the scalp; for chronic inflammation of the edges of the eyelids, and is commonly employed by the poor to destroy pediculi. It is sometimes used to cure scabies, and is a safe application for infants (*Thomson*).

UNGUENTUM HYDRARGYRI IODIDI, *L.*

OINTMENT OF IODIDE OF MERCURY.

Take of Iodide of mercury, an ounce.
White wax, two ounces.
Lard, six ounces.

Add the iodide to the wax and lard, melted together, and stir them together.

Medicinal use.—Used for dressing to scrofulous sores, but there is not much positive evidence of its utility.

UNGUENTUM HYDRARGYRI IODIDI RUBRI, *D.*

OINTMENT OF RED IODIDE OF MERCURY.

Take of Red iodide of mercury, a drachm.
Ointment of white wax, seven drachms.

Incorporate the iodide of mercury and ointment by careful trituration in a mortar.

Medicinal use.—A more active preparation than the former, and employed in analogous cases. It is sometimes very useful in obstinate ulceration or soreness of the edges of the eyelids. I have known its application to scrofulous sores cause intense pain. It ought to be largely diluted before being used.

UNGUENTUM HYDRARGYRI MITIUS.

(Now erased from the Pharmacopœia.)

Take of Strong mercurial ointment, ℔j; Lard, ℔ij.

UNGUENTUM HYDRARGYRI NITRATIS, *L D.*

OINTMENT OF NITRATE OF MERCURY.

Synonyme. Unguentum Citrinum, *D. E.* Golden Ointment.

Take of Mercury, two ounces.
Nitric acid, four fluid ounces.
Lard, a pound.
Olive oil, eight fluid ounces.

First dissolve the mercury in the acid; then mix the solution, while hot, with the lard and oil melted together.

D. Pure mercury, ℥j; Pure nitric acid, f℥j; Distilled water, f℥ss; Prepared lard, ℥iv; Olive oil, f℥viii. Mix the acid with the water, and dissolve the mercury in the mixture, with the aid of a gentle heat. Melt the lard with the oil, and while the mixture is hot, add to it the solution of mercury, also hot; let the temperature of the mixture next be raised so as to cause effervescence, and then, withdrawing the heat, stir the mixture with a porcelain spoon until it concretes on cooling.

E. The Edinburgh directions are given under Ung. Citrinum.

Remarks.—The proportion of acid now ordered in the Ph. L. appears much greater than it was in the last Pharmacopœia, but this is partly owing to the difference in the strength of the present acid; common nitric acid being now used, whilst an acid which was nearly one quarter stronger, was formerly employed; there is, however, more acid at present than formerly, even allowing for this difference.

Both the Lond. and Edin. Colleges order a much larger proportion of acid than the Dub. College, which will make a differen in the appearance and some of the properties of the ointmen The directions of the Edin. and Dub. Colleges about the degree o heat are important and should be attended to.

Process.—The changes which take place in forming this preparation are very complicated, and the ointment itself is liable t great variation. When strong nitric acid acts upon mercury, it i decomposed, and part of its oxygen combines with the mercury and forms oxide and binoxide of mercury, with which some undecomposed acid combines, whilst binoxide of nitrogen escapes. Ther are therefore in the mixture, nitrate of binoxide of mercury, nitrat of protoxide, and free nitric acid. When this mixture acts upo melted fat, the oleïne is converted into elaïdine, and binoxide o nitrogen escapes, and the fatty matters reduce the nitrate of mercury, into a yellow subnitrate of the protoxide. In the course o time, the mercury is partially reduced to the metallic state, whic gives the ointment a grey appearance. The temperature of th fat when the mercurial solution is added to it, ought to be considerable, as by this means the various chemical changes tak place more perfectly, and the result is more permanent and uniform An excess of acid is an advantage.

Properties.—This ointment ought to be yellow and soft; but i frequently becomes so hard as to admit of being powdered, and i long kept, it often becomes grey, from the separation of metalli mercury. When applied to the eyes, it sometimes causes muc pain; its strength should be reduced if this is the case.

Uses.— Nitrate of mercury ointment is intended as a substitut for the golden eye ointment, a patent preparation, and its mos important employment is still for lippitudo, or chronic inflammatio of the edges of the eyelids. For this purpose it is too strong alone and must therefore be diluted with two or three, or more parts o lard; this dilution, however, makes it quickly spoil, and it shoul only be prepared in small quantities at a time. It is also used, whe diluted, as an application to lepra, psoriasis, herpes, porrigo, sycosi menti, impetigo, and rupia. I am in the constant habit of usin an ointment composed of equal parts of this and of mercurial ointment, and three parts of lard, in porrigo of the scalp, in a larg workhouse, and I find it more useful than any application I hav yet tried. When applied to the eyelids, it should be first melted and a little smeared *at night* with the finger or a camel's hair penci upon their edges.

It ought never to be touched with an iron instrument, as thi decomposes it, and the ointment becomes black; wood or bon spatulas ought always to be employed.

UNGUENTUM HYDRARGYRI NITRATIS MITIUS, *L.*

Milder Nitrate of Mercury Ointment.

Take of Nitrate of Mercury ointment, an ounce.
Lard, seven ounces.

Rub them together.

This ointment is to be freshly prepared when wanted for use.

Uses.—See Ung. Hydr. Nitratis, above. This is a convenient strength for use in many cases.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI, *L.D.E.*

Nitrico-oxide of Mercury Ointment.

Synonyme. Unguent. Hydrarg. Oxydi Rubri, *D.* Unguent. Oxydi Hydrargyri, *E.* Red Precipitate Ointment.

Take of Nitrico-oxide of mercury, an ounce.
White wax, two ounces.
Lard, six ounces.

Add the nitrico-oxide, rubbed into a very fine powder, to the wax and lard, melted together; and rub them together.

D. Red oxide of mercury, ℥j; Ointment of white wax, ℥vii.

Uses.—This is a valuable ointment for the ulcers remaining after the scab of rupia has separated. In many cases, the formation of these rupious ulcers returns year after year, and they appear to be more benefited by this ointment than by any other application (*Tuckett*, Dreadnought). The ointment often causes acute temporary pain.

It is a most valuable remedy for *chronic conjunctivitis*, especially in scrofulous children. A portion, the size of a pin's head, is to be introduced into the *outer* angle of the eye every night; it gives severe pain for a few moments.

UNGUENTUM IODINEI, *E.*

Take of Iodine, one drachm.
Iodide of potassium, two drachms.
Axunge (lard), four ounces.

Rub the iodine and iodide well together, and then add gradually the axunge, till an ointment is obtained.

UNGUENTUM IODINII COMPOSITUM, *L.D.*

COMPOUND IODINE OINTMENT.

Take of Iodine, half a drachm.
Iodide of potassium, a drachm.
Rectified spirit, a fluid drachm.
Lard, two ounces.

Add to the lard, the iodide rubbed into as fine a powder as possible, and the iodine dissolved in the spirit, and rub them together.

D. Iodine, ʒss; Iodide of potassium, ℥j; Ointment of white wax, ʒxivss.

Remarks.—This ointment ought always to be made in an earthen or glass mortar, as the iodine instantly attacks a metallic spatula. The iodine does not *dissolve* in less than five times the quantity of spirit ordered by the Ph. L., but this quantity softens it by trituration, and reduces it to a fine powder, with which the iodide should be rubbed in the mortar, before the lard is added.

Uses.—It is rubbed upon the throat in bronchocele, and is applied to scrofulous glands, unsuppurating buboes, and the tumid belly of children suffering from mesenteric disease. It discolours the skin, and sometimes makes it very sore.

UNGUENTUM OPII, *L.*

OPIUM OINTMENT.

Take of Powdered opium, a scruple.
Lard, an ounce.
Rub them together.

Uses.—A soothing dressing to a painful ulcer.

UNGUENTUM OXIDI HYDRARGYRI, *E.*

Take of Red Oxide of mercury, one ounce.
Axunge, eight ounces.
See UNG. HYDRARG. NITR. OX., p. 807.

UNGUENTUM PICIS, *L.*

PITCH OINTMENT.

Synonyme. Unguentum Picis Nigræ, *Ph. L.* 1838.

Take of (Black) pitch,
Wax,
Resin, each, eleven ounces.
Olive oil, a pint.
Melt them together, and press through a linen cloth.

Medicinal uses. — Digestive and stimulant, and used in the same cases as the next.

UNGUENTUM PICIS LIQUIDÆ, *L. D. E.*

TAR OINTMENT.

Take of Liquid pitch (tar),
Suet, each, a pound.
Melt them together, and press through a linen cloth.

D. Tar, Oss; Yellow wax, ℥iv. Melt the wax, and mix them.

E. Tar, ℥v; Bees wax, ℥ij. Melt the wax, and mix them.

Medicinal uses. — This ointment is employed for the removal of tetter, tinea capitis, and lepra. It sometimes causes very disagreeable itching, if applied to the scalp. It has been used with great benefit by Dr. Parrish in *ophthalmia tarsi.* "It is to be carefully rubbed into the roots of the tarsi at bed time, and washed away with Castile soap in the morning." *

UNGUENTUM PLUMBI ACETATIS, *D. E.*

OINTMENT OF ACETATE OF LEAD.

D. Acetate of lead, ℥j; Ointment of white wax, ℔j.
E. Acetate of lead, ℥j; Simple ointment, ℥xx.
Mix them thoroughly.

Uses. — A cooling ointment to inflamed surfaces.

UNGUENTUM PLUMBI CARBONATIS, *D. E.*

OINTMENT OF CARBONATE OF LEAD.

D. Carbonate of lead, ℥iij; Ointment of white wax, ℔j.
E. Carbonate of lead, ℥j; Simple ointment, ℥xx.
Mix them thoroughly.
Doses. — A cooling ointment for inflamed ulcers.

UNGUENTUM PLUMBI COMPOSITUM, *L.*

COMPOUND LEAD OINTMENT.

Take of Prepared chalk, six ounces.
Dilute acetic acid, six fluid ounces.
Lead plaster, three pounds.
Olive oil, eighteen fluid ounces.
Melt the plaster in the oil with a slow fire; then add

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* Braith. Retr. vol. xxv. p. 326.

first the chalk and afterwards the acid, stirring constantly until they are cooled.

Medicinal use. — Employed as a dressing to irritable or inflamed ulcers. It is a very unirritating dressing, and can be borne by some ulcers which are so irritable as to suffer from the application of even simple cerate. When however ulcers are so irritable as to require this ointment, a solution of one ounce of laudanum in half a pint of water, applied as a lotion and covered with oiled silk, will generally answer better.

UNGUENTUM PLUMBI IODIDI, *L. D.*

Ointment of Iodide of Lead.

Take of Iodide of lead, an ounce.
Lard, eight ounces.
Rub them together.

D. Iodide of lead, ℥j : Ointment of white wax, ℥vii.

Medicinal use. — Employed in chronic enlargement of joints and for the removal of enlarged scrofulous glands. It is used in just the same cases as the unguentum iodinii compositum. I have seen very little benefit from its employment.

UNGUENTUM POTASSII IODIDI, *L. D.*

Ointment of Iodide of Potassium.

Synonyme. Unguentum Potassæ Hydriodatis.

Take of Iodide of potassium, two drachms.
Boiling distilled water, two fluid drachms.
Lard, two ounces.
Dissolve the iodide in the water; then mix the lard.

D. Iodide of potassium, ʒj ; Distilled water, fʒss ; Ointment of white wax, ℥vii.

Properties and uses. — It is applied to enlarged and scrofulous glands and tumours, to promote their absorption. This ointment sometimes becomes coloured, owing to the gradual decomposition of the iodide; the iodine being set free, and making it brown.

UNGUENTUM PRECIPITATI ALBI, *E.*

White Precipitate Ointment.

Take of White precipitate, two drachms.
Axunge (lard), three ounces.

Melt the axunge, add the white precipitate, and stir the mixture briskly, while it concretes on cooling.

Uses. — See Unguent. Hydrarg. Am.-chlor., p. 804.

UNGUENTUM RESINÆ, *D.*, RESINOSUM, *E.*

Resin Ointment.

Take of Resin, half a pound (*D.*), five ounces (*E.*).
Yellow wax, four ounces (*D.*), two ounces (*E.*).
Lard, one pound (*D.*), eight ounces (*E.*).

Melt them together; strain while hot through flannel, and stir till they cool.

Uses. — A stimulating dressing to indolent ulcers.

UNGUENTUM SABINÆ, *L. D.*

Savine Ointment.

Synonyme. Ceratum Sabinæ, *Ph. L.* 1836.

Take of Savine, freshly bruised, half a pound.
White wax, three ounces.
Lard, a pound.

Mix the savine with the lard and wax, melted together; then strain through linen.

D. Savine tops, dried and in fine powder, ʒj; Ointment of white wax, ʒvii. Mix intimately by trituration.

Uses. — This ointment is used to keep up suppuration from a blister or issue, by preventing it from healing. (See Empl. Canth., *Uses;* and Potassæ Hydras., *Uses.*— *Issues*, p. 556.)

UNGUENTUM SAMBUCI, *L.*

Ointment of Elder.

Take of Elder (flowers),
Lard, of each, one pound.

Boil the elder flowers in the lard, until they become crisp; then press through a linen cloth.

Medicinal use. — This is employed for the same purposes as the unguentum cetacei, over which it possesses the advantage of an agreeable smell; and is sometimes soothing to irritable sores.

UNGUENTUM SIMPLEX, *E.*

SIMPLE OINTMENT.

Take of Olive oil, five and a half fluid ounces.
White wax, two ounces.
Melt together.

Uses. — A simple unirritating salve.

UNGUENTUM SULPHURIS, *L. D. E.*

OINTMENT OF SULPHUR.

Take of Sulphur, half a pound.
Lard, a pound.
Rub them together.

D. E. Sulphur, ℔j; Lard, ℔iv.

Remark. — This ointment formerly contained oil of bergamot, which is now omitted; the odour is therefore different from what it was, though its real virtues continue the same. (See UNG. SULPH. COMP.)

UNGUENTUM SULPHURIS COMPOSITUM, *L.*

COMPOUND OINTMENT OF SULPHUR.

Take of Sulphur, four ounces.
White hellebore, powdered, ten drachms.
Nitrate of potash, powdered, two scruples.
Soft soap, four ounces.
Lard, a pound.
Rub together.

Remark. — This ointment formerly contained oil of bergamot, which is now omitted.

Medicinal use. — This and the last ointment are only used for the cure of the itch; the compound ointment sometimes excites too much irritation. They should be used night and morning, until the disease is cured.

UNGUENT. SULPH. CUM POTAS. CARB. (Not Off.)

Take of Carbonate of potash, one ounce.
Sulphur, two ounces.
Lard, eight ounces.
Mix them thoroughly.

Remarks.—I have mislaid the authority for this ointment, which was put forth with strong encomiums by its proposer, if used in the following manner for the cure of itch: — "Wash thoroughly with *soft* soap for one hour and a half, then dry, and rub the above ointment thoroughly for half an hour. In two days use the bath again, and the cure is generally complete without longer confinement."

UNGUENTUM SULPHURIS IODIDI, *L.*

OINTMENT OF IODIDE OF SULPHUR.

Take of Iodide of sulphur, powdered, half a drachm.
Lard, an ounce.
Rub them together.

Uses.—This ointment is used for the cure of itch and of psoriasis. It should not be employed when the skin is very irritable.

UNGUENTUM ZINCI, *L. D. E.*

OINTMENT OF ZINC.

Synonyme. Unguentum Zinci Oxydi, *D.*

Take of Oxide of zinc, an ounce.
Lard, six ounces.
Mix.

E. Oxide of zinc, ʒj; Simple liniment, ʒvi.
D. Oxide of zinc, ℥ij; Ointment of white wax, ʒxij.

Use. — This is recommended as being useful in ophthalmia tarsi, smeared upon the eyelids every night. It is also applied to sore nipples and ring-worm of the scalp.

From what has been stated of the oxide of zinc, it is evident that this is not an ointment of the oxide, but of the carbonate of zinc, which appears nevertheless to occasion very little difference in its properties.

VEGETABILIA PRÆPARATA.

PREPARED VEGETABLE SUBSTANCES.

AMMONIACUM PRÆPARATUM.

PREPARED AMMONIACUM.

Take of Ammoniacum, in tears, a pound.
Water, sufficient to cover it.

Boil the ammoniacum with the water, until they mixed; strain the mixture through a hair sieve, evaporate so far in a water-bath, constantly stirri that it may become solid when it cools.

Remark.—By this process, ammoniacum is freed from seeds stalks.

ASSAFŒTIDA PRÆPARATA.

PREPARED ASSAFŒTIDA.

Prepare this in the same way that is directed Prepared Ammoniacum.

CASSIA PRÆPARATA.

PREPARED CASSIA.

Take of Cassia, broken longitudinally, a pound.
Distilled water, sufficient to cover it.

Macerate for six hours, frequently stirring; stra the pulp washed out (from the pods) through a h sieve; and evaporate in a water-bath to the consisten of a confection.

Remark.—Cassia pulp (the medicinal substance) surroun the seeds, and is enclosed in the hard inert pod, in little ce caused by transverse septa (false dissepiments as they are term by botanists). It is washed out by the water from the pod a seeds.

GALBANUM PRÆPARATUM.

PREPARED GALBANUM.

Prepare this as is directed for Prepared Ammoniacum.

PIX BURGUNDICA PRÆPARATA.

PREPARED BURGUNDY PITCH.

Prepare this as is directed for Prepared Ammoniacum.

Remark.—The pitch is very impure at first, from the admixture of chips and broken twigs, from which it is separated by the above process.

PRUNUM PRÆPARATUM.

PREPARED PRUNES.

Take of Prunes, a pound.
Water, sufficient to cover them.

Boil gently for four hours; press the softened pulp, first through an open cane sieve, and afterwards through a fine hair sieve; lastly, evaporate in a water-bath to the consistence of a confection.

Remark.—By this process the stones and skins of the prunes are removed, and only the pulp passes through.

SAGAPENUM PRÆPARATUM.

PREPARED SAGAPENUM.

Prepare this as is directed for Prepared Ammoniacum.

STYRAX PRÆPARATUM.

PREPARED STORAX.

Take of Storax, a pound.
Rectified spirit, four pints.

Dissolve the balsam and strain through linen; then let the greater part of the spirit distil by a gentle heat; evaporate what is left in a water-bath to a proper consistence.

Remarks.—Storax being a balsam and insoluble in water, spirit, in which it is soluble, is employed in this instance to separate the pure balsam from twigs and sticks.

TAMARINDUS PRÆPARATUS.

PREPARED TAMARIND.

Take of Tamarind, a pound.
Water, sufficient to cover it.

Macerate it with a gentle heat for four hours, proceed as is directed for Prepared Prunes.

Remark. — Common tamarind contains the stones of the f and a large quantity of woody fibres, which are separated by process.

THUS PRÆPARATUM.

PREPARED FRANKINCENSE.

Take of Frankincense, a pound.
Water, sufficient to cover it.

Boil the frankincense in the water until it melts, strain it through a hair sieve; then, when it is c keep the frankincense for use, after pouring off water.

Remarks. — By this process a large quantity of woody matt separated, which is always present in common frankincense.

VINA.

Medicated Wines should be prepared in stopped glass vessels, and frequently shaken during maceration.

WINES.

Description.— Wines are prepared by the fermentation of grape juice, and differ exceedingly in their colour and flavour, and also in some of their effects, though they agree in general properties.

Composition. — They are all aqueous solutions of alcohol in various proportions, and likewise contain a variety of colouring and other organic ingredients, which modify their action so as to produce very different effects from those which would be caused by a simple mixture of spirit and water in the same proportions. They also contain a small quantity of a peculiar volatile liquid, termed œnanthic ether, to which the vinous odour is due. Its ultimate composition is C^{18}, H^{18}, O^{3}, and it is a compound of œnanthic acid, $C^{14}, H^{13}\, O^{2}, +$ ether, or oxide of ethyle, C^{4}, H^{5}, O. The characteristic odour or *bouquet*, which distinguishes one wine from another, is due to some other principles which have not yet been determined with accuracy. *Foreign wines*, or those made from the grape, contain a considerable quantity of *tartaric acid*, which exists in the form of bitartrate of potash (cream of tartar). This is but slightly soluble in wine, and is gradually deposited upon the interior of the cask in which the wine is kept, forming the "crust." *English wines*, on the contrary, or those made from the currant, gooseberry, cowslip, &c., contain *citric* or *malic* acid, instead of tartaric acid. The salts formed by these acids, as well as the acids themselves, are soluble; and the acids thus remain dissolved in the wine. In order to cover the acidity, a large quantity of sugar is added, and also a considerable quantity of spirit to prevent this sugar from fermenting. This spirit, not being in a state of natural combination with the wine, produces the same effect as any artificial mixture of spirit and water. Thus British wines contain more free alcohol than foreign wines, which latter, however, generally contain some free spirit, added by the wine merchant to make them keep, as they also contain some, though but a small, proportion of citric and malic acids.

Sherry is the only officinal wine; but in the following table, taken from Christison, is given the per-centage of spirit in the wines most commonly used.

The proportions given in the following table are somewhat lower than those stated by Brande, and some other chemists.

Wines.	Alcohol by weight, in 100 parts.	Proof Spirit by in 100 parts.
Port (average) - - -	16·3	36·4
Sherry - - - -	15·3	33·6
Madeira - - -	14·1	30·8
Dry Lisbon - - -	16·1	34·7
Claret - - - -	7·7	17·0
Vin ordinaire - - -	9·0	19·0
Light German wines (average)	about 7·5	17·0
Edinburgh ale - - -	5·7	12·6
London porter - - -	5·3	11·9

Medicinal properties.—In general, similar to those of alco
see p. 692.; but they are less 'rapid in their effects, and m
durable; they are more tonic, and less stimulant; more liable
cause gout and gravel, if habitually used, but less frequen
induce delirium tremens, or diseased liver; and they intoxic
more slowly, and do not, in general, disorder the stomach so mu
as spirits. Since the very general spread of tee-totalism, t
habitual use of wine has much diminished, and in most ca
without inducing any bad consequences. It is certainly not tr
that the moderate daily use of wine, if accompanied with suitab
exercise, is generally followed by the evil effects upon the cons
tution, of which such exaggerated accounts have been circulate
in most cases it is a matter of indifference as regards the healt
whether it is taken or not. It is a frequent mistake to imagi
that severe and continued muscular or mental exertion can b
better sustained if wine or beer is taken, than if they are omitte
Some of our most celebrated pedestrians, before the days
Father Matthew, condemned the use of wine or malt liquor, exce
in the most moderate quantities; and I have frequently foun
that a walk of thirty or forty miles in the day has been acco
plished with much less exhaustion when I have abstained fro
both, than when I have taken even a small quantity. One or t
glasses of wine, taken to relieve commencing exhaustion, ha
generally been followed by a much more rapidly increased sense
fatigue, than when the journey has been pursued entirely witho
them.* When taken medicinally, wines frequently excite such
degree of nervous energy, as enables the stomach to digest th
proper quantity of food, which it would otherwise be unable to d
and they thus become, in effect, permanent tonics. It is n
unusual to find the system so exhausted, after a disproportiona
degree of fatigue or fasting, that the mere thought of food
loathsome; in such a case, a glass of wine revives the nervo
energy sufficiently to enable the stomach to bear the necessar
food, which it could not have done without such assistance.

* For valuable information on this subject, see Carpenter's Pri
Essay on the Use of Alcoholic Liquors.

Peculiarities of the different Wines.

Port is the wine most commonly used medicinally. It is ***astringent***, and causes constipation, and is liable to be followed by more disorder of the stomach than some of the others. It is sometimes used as an astringent gargle, and as an injection for the cure of hydrocele.

Sherry contains less free acid, and is less stimulating than most wines, and seldom disagrees with the patient. It is considered to be almost the only wine admissible for gouty persons; but Dr. Craigie condemns the use of even this, in the most uncompromising terms; and says that neither it nor any wine is to be allowed in this disease, unless the patient cannot be induced to abstain entirely.

Madeira contains more free acid than the others, and is a good dietetical wine when this property does not render it objectionable. It is less stimulating than port; but more liable to cause acidity of the stomach.

Claret and the light German wines contain more free acid, and are less stimulating. Their acidity renders them admissible and useful in calculous affections, in which there is undue deposition of phosphates.

Uses. — As a pharmaceutical agent, wine is used to extract the medicinal properties from some drugs which require spirit for their solution. The chief medicinal employment of wine is in *fever;* and the indications for its use are, generally, a weak, failing pulse, and brown or black loaded tongue, with other symptoms of prostration. If it re-excites feverishness, its use should be suspended for a time.

Dose. — f℥ij to f℥xvi or f℥xx, according to the degree of prostration and the effects produced. The latter quantity is scarcely ever required.

VINUM ALOËS, *L. E.*

Wine of Aloes.

Take of Aloes (Socotrine or hepatic), rubbed to powder, two ounces.
Canella, powdered, four drachms.
Sherry wine, two pints.
Macerate for seven days, and strain.

E. Aloes, Socotrine or East Indian, ℥jss; Cardamom seeds, ground, Ginger, in coarse powder, of each, ʒjss; Sherry, Oij. Macerate seven days, and strain.

Medicinal properties and uses. — Stomachic; purgative.

Dose. — fʒij as a stomachic; f℥ss to f℥j as a purgative.

CANELLA (Dodecandria Monogynia; Guttiferæ).

Description.—Canella bark, frequently called Canella alba, fro its colour, is in pieces several inches long, generally slight quilled, but often nearly flat; about a quarter or a third of inch thick; and of an almost white colour.

Composition.—Volatile oil, resin, bitter extractive, and *canelli* which is a crystalline saccharine substance.

Medicinal properties.—Highly *aromatic*; *stimulant*; and *tonic*.

Uses.—Sometimes as an aromatic condiment or spice. medicine, chiefly to correct the griping of aperients or other m dicines. The vinum aloës is used in cold phlegmatic habit in dyspepsia and chlorosis.

Dose and preparations.—Canella is seldom given in powder: th dose may be gr. x to ʒss. There is no officinal preparation i which it is the chief ingredient.

VINUM COLCHICI, *L. E.*

WINE OF MEADOW SAFFRON.

Take of Meadow saffron cormus, dried, eight ounce
Sherry wine, two pints.
Maccrate for seven days, and strain.

Remarks.—This wine deposits a sediment which Sir. E Hom thought to contain the purgative principle, but which Sir C Scudamore finds to be inert.

Medicinal properties and uses.—See ACETUM COLCHICI, p. 68.

Dose.—♏xxx to ʒj.

VINUM GENTIANÆ, *E.*

GENTIAN WINE. "BITTERS."

Take of Gentian, half an ounce.
Yellow bark, one ounce.
Canella, one drachm.
Bitter orange peel, dried, two drachms.
Proof spirit, four fluid ounces and a half.
Sherry, one pint and sixteen fluid ounces.

Digest the root and barks, all coarsely powdered, for twenty-four hours in the spirit; add the wine, and digest for seven days more; strain, express the residuum strongly, and filter.

Medicinal properties and uses.—*Aromatic tonic.*

Dose.—f℥ss to f℥ij an hour before dinner.

VINUM IPECACUANHÆ, *L. D. E.*

IPECACUANHA WINE.

Take of Ipecacuanha, bruised, two ounces and a half.
Sherry wine, two pints.
Macerate for seven (fourteen, *D.*) days, and strain.

Description. — *Properties and uses.*—See PULVIS IPECACUANHÆ COMPOSITUS, p. 672.

Remarks upon the vinum ipecacuanhæ.—Wine dissolves the emetina, which is the active principle of ipecacuanha. This preparation is chiefly employed as an emetic or diaphoretic for children, as it is less depressing and irritant than tartar-emetic.

Dose. — ♏xxx to f℥j, repeated every ten or fifteen minutes, until vomiting is produced; or ♏x to ♏xl every two or three hours, as a nauseant diaphoretic in the bronchitis or pneumonia of infants. Nearly half an ounce is frequently required before vomiting is produced.

VINUM OPII, *L. D. E.*

WINE OF OPIUM.

Take of Extract of opium, two ounces and a half.
Cinnamon, bruised,
Cloves, bruised, each, two drachms and a half.
Sherry wine, two pints.
Macerate for seven days, and strain.

D. Opium, ℥iij; Sherry, Oij. Macerate fourteen days, and filter.

E. Opium, ℥ij; Cinnamon, Cloves, of each, ʒijss; Sherry, Oij. Digest for seven days, and filter.

Remarks. — This preparation differs from tinctura opii, not only in containing aromatics, but in the use of extract of opium. It is difficult to form an estimate of the comparative powers of these preparations, though they differ but little. Vinum opii is less disagreeable than the tincture, not only on account of the aromatics which it contains, but because the opium during purification loses its peculiar and disagreeable smell and taste.

Medicinal properties and uses. — *Stimulating anodyne.* It is not often given internally, but is chiefly used in the chronic stage of ophthalmia, in which it was recommended by Mr. Ware. It causes acute pain for a few minutes, which is soon followed by great relief. Two or three drops should be dropped into the *outer* angle of the eye at night, just before bed-time.

Dose. — ♏v to ♏xl, or f℥j.

VINUM RHEI, *D.E.*

RHUBARB WINE.

D. Take of Rhubarb, in coarse powder, three ounces.
Canella, in coarse powder, two drachms.
Sherry, two pints.
Macerate fourteen days; strain, express, and filter.

E. Rhubarb, ℥v; Canella, ʒij; Proof spirit, f℥v; Sherry, O and f℥xv. Digest seven days; strain, express, and filter.

Medicinal properties and uses. — *Aromatic purgative.*

Dose. — fʒj or fʒij, added to other purgatives; or f℥ss to f℥ taken alone.

VINUM TABACI, *E.*

TOBACCO WINE.

Take of Tobacco, three ounces and a half.
Sherry, two pints.
Digest for seven days; strain, express, and filter.

VINUM VERATRI, *L.*

WINE OF WHITE HELLEBORE.

Take of White hellebore, sliced, eight ounces.
Sherry wine, two pints.
Macerate for seven days, and strain.

Medicinal properties and uses. — It increases all the secretions and in large doses is *emetic* and *cathartic*. It is sometimes used as a substitute for colchicum, in *gout.* (See ALKALIES, VERATRUM, p. 203.)

Dose. — ♏x, twice or three times a day, to be gradually increased.

APPENDIX.

[In this Appendix are inserted some medicinal agents which are not yet officinal, or such as being officinal do not enter into any of the preparations in the Pharmacopœia. They are not generally substances of great importance, though some of them may, perhaps, become so, when better known.]

No. I.

ARTEMISIA ABSINTHIUM, WORMWOOD (Syngenesia Polygamia Superflua; Compositæ).

Description. — This is a low shrubby plant, about a foot high, with minutely divided green leaves, and small tufted yellow flowers. The whole plant is medicinal.

Composition. — Volatile oil; bitter principle; absinthic acid; salts of potash.

Medicinal properties and uses. — *Bitter tonic* and *anthelmintic.* It does not possess much power, and is very seldom used. It sometimes causes headache and giddiness.

Dose. — Of an infusion, made from ℥j of the plant in Oj of boiling water, f℥j, three or four times a day.

ACETOSELLA (OXALIS), WOOD SORREL (Decandria Pentagynia; Oxalidaceæ).

Description. — This is a beautiful delicate little flowering plant, a few inches high; the whole plant is medicinal.

Composition. — The only important ingredients are oxalic acid and oxalate of potash.

Medicinal properties and uses. — The fresh plant is a valuable *antiscorbutic*, when taken as an article of food; and, when boiled with milk, it forms an agreeable refrigerant whey in fever.

Dose. — Ad libitum.

ALLIUM SATIVUM, GARLICK (Hexandria Monogynia; Liliaceæ).

Description, &c. — Garlick is too well known to require description. It contains a volatile oil, which is acrid and stimulant. Garlick is used principally as an article of food, but it is sometim employed in atonic dropsies, and in the chronic bronchitis of o persons. The cloves macerated in vinegar form a solution, whic may be rubbed between the shoulders to relieve the paroxysms hooping cough. The juice mixed with oil is rubbed upon th spine in infantile convulsions, or upon the abdomen to relie flatulent colic. A few drops are dropped into the ear to relie deafness dependent upon an unhealthy secretion of wax. Th dose when taken internally is one or two drachms swallowed whol A clove of garlick is sometimes laid upon indolent tumours promote suppuration.

ALLIUM PORRUM, The Leek (Class and Order as above).

Remarks. — This is only used as an article of diet. It resembl the garlick in properties, but is milder.

ALLIUM CEPA, Onion (Class and Order as above).

This vegetable resembles the last in properties, &c., but is weake Onion tea is a popular and useful remedy for the flatulent colic o infants. Raw onions are useful in the pituitous catarrh of ol people, and an onion poultice sometimes relieves earache.

NEPHRODIUM (ASPIDIUM) (FILIX) MAS, Male Fer (Cryptogamia, Filices).

Description. — Male fern root consists of bundles of matted blackish fibres, forming a dark scaly tuft. After being once seen it is not likely to be mistaken for any other officinal root.

Composition, uses, &c. — Fern root contains a volatile and fixed oil, soluble in ether and alcohol, on which its properties depend; and several other unimportant constituents. It is only used as an *anthelmintic* to expel tape-worms, to which it acts as a poison, as they are generally discharged dead. Two or three drachms of the powdered root are to be taken fasting, and in two hours a jalap cathartic. It is not so useful or certain as oil of turpentine, and sometimes causes vomiting. Thirty minims of the oil (not officinal) answer the same purpose. See p. 641.

AVENA SATIVA, Oat (Triandria Digynia; Gramineæ).

Description. — The oat is an elegant grain, with a loose, drooping panicle. The officinal part is the seeds deprived of their husks, in which state they are called groats; when these are crushed they are termed Embden groats.

Composition. — Starch; sugar; and gluten. It does not contain so much of the latter as wheat flour.

Medicinal properties. — *Nutrient* and *laxative.* Oatmeal has a sweetness which is agreeable to those who are accustomed to its use as an article of diet, and it is slightly laxative. Porridge, made by boiling it with milk or water, is not unfrequently used in the North of England and in Scotland with this intention, by those who do not habitually take it as food. A still more laxative article of food is prepared from oatmeal and treacle, baked together. When boiled in water, groats form a thin gruel, which is in extensive use under the name of water-gruel; when mixed with the cold sour bottoms of a beer barrel, oatmeal makes an excellent poultice for removing chronic swellings depending upon languid circulation, as when ulcers on the foot or leg are accompanied by œdema.

Uses. — As an article of diet, as water-gruel, in fever, common catarrh, &c.; and in the form of poultice, for the purpose just mentioned. Gruel is given as an unstimulating article of food, after poisoning with the mineral poisons, and forms a very common and useful laxative enema, when a little salt is previously added.

BERBENA (Nat. Ord. Verbenaceæ).

The Berbena is a wild shrub which grows abundantly in the West Indies, especially in low moist grounds, and has lately been brought into notice in the treatment of *yellow fever*. The juice of the pounded leaves of this plant is given in *yellow fever* in small doses (dose not specified) three times a day, and injections of the same every two hours until the bowels are emptied. It quickly checks the black vomit and yellow fever, and its use is now general amongst the doctors there, and few patients now die of these diseases. This account appears to be well authenticated.*

CANNA, Tous-les-Mois.

This is a fecula resembling starch in its nutritious and chemical properties. It is obtained from the root of an imperfectly determined species of Canna, which is cultivated at St. Kitts. It is only used as an article of diet. The particles are white and have a somewhat satiny lustre, and are larger than those of the other amylaceous articles of food.

CENTAUREUM, Erythræa Centaureum, Common Centaury (Pentandria Monogynia; Gentianaceæ).

Description and uses. — This is an elegant flower, blossoming in July and August, having pink flowers, and growing about a foot high. It contains a bitter principle, and, though seldom used, may be employed for the same purposes as gentian root, which it resembles in its tonic properties.

Dose. — ʒij, made into an eight ounce infusion; f℥j at a time.

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* Ranking's Abstr. vol. xviii. 1853, p. 7., copied from the Charlestown Med. Jour. and Rev. for July, 1853.

COFFÆA ARABICA (Nat. Ord. Cinchonaceæ).

Strong coffee has long been used to relieve the dyspnœa of spasmodic asthma, and in France it is frequently infused along with senna, or used as a vehicle for the administration of quinine, the flavour of both which medicines it is said to cover. It has lately been recommended in the treatment of *hooping cough*, the paroxysms of which it is said to abate in a remarkable manner, and eventually to check completely in a few days. The dose is a tea-spoonful made into very strong coffee for a child two years old; a dessert-spoonful for one four years old; and a table-spoonful above this age. Several cases are reported; but the relief said to have been obtained has been so great and rapid, as almost to excite scepticism as to their reality.*

COPALCHI, CORTEX. (Not Off.)

This bark is obtained from the Croton Cascarilla of Don, and according to Dr. Stark, who is at present our only authority upon the subject, it is a more aromatic and grateful bitter tonic than any we possess. He has found it useful in the cases in which remedies of that class are employed, and it possesses the advantage of its more agreeable properties. The preparations (Inf., Tinct., &c.) are similar both in strength and dose to those of other bitters.†

EUPHORBIUM, EUPHORBIA OFFICINARUM (Monœcia Monandria; Euphorbiaceæ).

The plant from which it is obtained is thick, fleshy, and covered with spines. On making incisions, a very acrid juice exudes, which dries round the spines, and constitutes euphorbium.

Description. — Euphorbium is generally seen in small pieces, of a pale brown colour; they are pierced by holes, which frequently contain fragments of the spines, around which the juice has concreted, and by which the tubes in the interior of the euphorbium are formed.

Properties. — Euphorbium is violently *irritant*, and is so dangerous in its effects, that it is never given internally. It has been employed as an errhine, previously largely diluted with flour or starch; in this form, it is used in some chronic affections of the eyes, ears, or brain. It is used by the Edinburgh College in making blistering plaster.

FARINA, FLOUR, TRITICUM HYBERNUM (Triandria Digynia; Gramineæ).

Description. — Both wheat and wheat flour are too well known to require description.

Composition. — *Starch; sugar;* and *gluten.* The last is the most nutritious part of farinaceous food, and is a highly azotised vegetable principle. It is that which gives tenacity to bread, and is much more abundant in the wheat of Italy than in that of our own country; a circumstance which renders Italian flour so much better adapted for making vermicelli and macaroni than our own. The chemical characteristic of gluten is, that it forms a blue colour when triturated with tincture of guaiacum; the blue tint is produced slowly and imperfectly, if it is triturated with powdered guaiacum. Gluten rapidly decomposes when exposed to heat and moisture; it is also capable of undergoing the changes which are necessary to the process of fermentation.

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* Braith. Retrosp. vol. xx. p. 89.

† Ed. Med. and Surg. Jour., q. by Braith. vol. xix. p. 385.

For the characteristics of starch, see Decoctum Amyli.

Medicinal properties and uses. — It is chiefly as an article of food that flour is important. It is sometimes used as a dry powder to envelope pills, to prevent their sticking together; and bread crumb is employed for giving form and tenacity to some pills. Wheat flour is sometimes dusted upon a burnt or scalded surface, and, in the absence of anything better, is very good. It acts by sheathing the parts from the influence of the air. The objections to its use are, that it quickly decomposes, smells, and breeds maggots; and when it has been on a short time, it becomes moist, then dries, cracks, and produces great discomfort to the patient. The advantages in its favour are, that it is always at hand; that it is easily and quickly applied, and the sufferer may soon be covered so as to allow of being put to bed, and protected from the cold, which is so distressing to a burnt patient. It can be applied to parts which will not bear any other dressing, as the face and scalp. It is a most soothing application when dusted upon an erysipelatous surface. Bread and water form a common and useful emollient poultice.

As an article of diet for infants, the mode of preparing flour is by no means unimportant. It should either be spread dry and thin upon a dish, and baked in a moderately cool oven until it is so hard and caked together as to require crushing with a rolling pin; or it should be put into an earthenware pot, and this should be placed in a pan of boiling water and kept at this temperature for two or three hours; the hard, caked mass must then be broken up as before. From a tea-spoonful to a table-spoonful of this prepared flour may be boiled with a little white sugar in the milk intended for the infant's use; and prepared in this way, it not only forms a wholesome article of diet, and is digested without occasioning flatulence, but it often restrains a relaxed condition of the bowels, especially if American flour is used, which is much drier naturally than English flour.

FRUCTŪS AROMATICI, Aromatic (Carminative) Fruits (Seeds).

I have thought this the most convenient title and place for a slight description of those medicinal fruits (anise, caraway, &c.)

which do not deserve a lengthened notice, but which are often a source of difficulty to students, from their similarity to each other in general appearance. By placing them together under one head, their distinguishing characters, slight as they are, may be more readily perceived and remembered, than if they were described under some of their preparations.

Though generally called *seeds*, they are, botanically, *fruits*, and their structure is curious. They all belong to the same natural order, Umbelliferæ; and the same description is applicable to each.

Fig. 1.

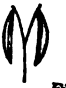

Fig. 2.

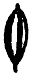

Fig. 3.

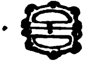

Fig. 2. represents the ordinary appearance of one of these fruits, for example, fennel. This may be separated into two symmetrical halves, as in *fig.* 1., each of which is termed a *mericarp* (μερος, meros, *a part*; καρπος, karpos, *a fruit*). These halves hang by their summits from the extremity of the stalk, which divides into two parts, and is termed the carpophorus (καρπος, karpos, *a fruit*; φερω, phero, *I bear*). Thus, the same fruit sometimes appears round, whilst, at other times, one side is convex, and the other flat, if the halves happen to have separated from each other. *Fig.* 3. is a transverse section. The little projections are termed *ridges*, and in these are minute cells, termed *vittæ*, which contain the essential oil that gives flavour to the fruit; these vittæ are situated not only in the ridges, but also in the approximated sides of the mericarps. Some umbelliferous fruits have no vittæ.

ANETHUM GRAVEOLENS, Dill (Pentandria Digynia; which are the Linnæan class and order of all these fruits).

Description.—Small, circular or oval; flat at the summit, with a round central elevation; of a dark brown colour. It is not liable to be mistaken for any other fruit.

ANGELICA (ARCHANGELICA, *D. E.*), Archangel. The Roots, *E.* The Seed (Fruit), *D.*

Description.—The *root*, as it is imported from Hamburgh, whence it chiefly comes, consists of a short conical or cylindrical mass, from which proceed several long, slightly twisted branches, about as thick as a goose-quill. It has a fragrant, but peculiar, odour. The *seed* (fruit) whilst whole, is oval, but when separated, as it usually is in the shops, each mericarp is flat on the side opposed to its fellow, whilst the ridges are very prominent on the convex surface. They have a peculiar fragrant odour, especially when bruised between the fingers.

Roots and seeds for which it may be mistaken.—The odour of the root distinguishes it from any other, besides its general appearance. The fruit is larger, softer, paler, and with more prominent ridges than any other officinal umbelliferous fruit; and is effectually distinguished by its odour and flavour.

Medicinal properties and uses.—Both the root and seeds contain a volatile oil, which renders them aromatic, for which property alone they are valued. The root is slightly tonic, but though an infusion of it is an elegant placebo, it is worth little more. They are much employed for flavouring liqueurs.

Dose.—℥ss of the root, to ℥viij or ℥xvi, of water; f℥j for a dose.

ANISUM, PIMPINELLA ANISUM, ANISE.

Description.—*Small;* oblong; acute at the summit; obtuse at the base: numerous *slightly* elevated ridges; pale-brown colour; many vittæ, and the fruit has a slightly oily appearance; strong and characteristic flavour.

It may be *mistaken for the fruit of conium;* the distinguishing characters are given in the description of that fruit.

CARUM CARUI, CARAWAY.

Description.—Slender; much longer than it is broad; curved longitudinally; prominent *white* ridges; fruit itself, dark *brown;* flavour strong, agreeable, and characteristic. It is so different from all the others, that it is not likely to be mistaken.

CONIUM MACULATUM, HEMLOCK.

Description.—Nearly globular; somewhat larger than anise, with fewer ridges, but these more *prominent;* ashy or slate coloured, rather than brown; *no* vittæ; flavour slight.

It is often *mistaken for anise,* from their general resemblance in size and figure: but the above characters are sufficient to distinguish them.

CORIANDRUM SATIVUM, CORIANDER.

Description.—Small; *globular; pale yellow; slightly* prominent ridges; mericarps convex externally; *concave,* not flat, internally; flavour, agreeable and characteristic. It is scarcely possible that it can be mistaken for anything else.

CUMINUM CYMINUM, CUMIN.

Description.—Slender; acute at both ends; ridges, slight; colour, dull brown; taste, peculiar and disagreeable.

It is very likely to be mistaken for fennel.

DAUCUS CAROTA, CARROT.

Description.—The fruit is small, about 1/8th of an inch in diameter, circular, flat, and its margin is surrounded by a fringe of short hairs, giving it a very characteristic appearance. It is not likely to be mistaken for any other fruit.

FŒNICULUM VULGARE, FENNEL.

Description.—It is one of the largest of the umbelliferous fr acute at each end; ridges, prominent and sharp; colour, br greenish-yellow, intermixed with brown; flavour, weak.

It is very likely to be mistaken for cumin, or for sabad (See ALKALIES, VERATRIA, p. 202.).

GALIUM APARINE, COMMON GOOSEGRASS. (Not Off.)

A handful of this herb boiled in a quart of water for twe minutes, and taken freely, is reported by Dr. Winn to have cu an obstinate case of lepra of many years' standing. (*Braith. R* vol. xxiv. p. 333.). This disease is so capricious that little confide can be placed in a single case of improvement; but the remed a simple and abundant one, and worth trial. After two years' perience of its effects, Dr. Winn reported still more favourabl this remedy at the London Med. Soc. in cases of lepra, psori eczema, and lichen. (*Ass. Med. Jour.* Feb. 1854, p. 152.)

GOSSYPIUM, *E.* COTTON, GOSSYPIUM HERBACEUM (Mon delphia Polyandria; Malvaceæ).

Description and uses.— Cotton wool, carded cotton, or waddi is the principal form in which cotton is used medicinally. I never employed internally, but is a valuable application to ext sive burns; the object being, in these cases, to cover the patient quickly as possible from the air. The cotton, cut into long w strips, is loosely applied to the burnt surface, and confined th by a bandage; when suppuration commences, portions of t cotton must be cut away as they become loose, and their place su plied by others; but force should never be employed to det any adhering portions.

Ointments are often spread upon cotton and linen rags, latter being the best. The reason assigned for this is, that li consists of hollow tubes, and thereby absorbs purulent and ot discharges, whilst the tubes of cotton are filled with a substa which prevents further absorption.

Cotton is less quickly acted upon by alkalies and acids t linen, and is hence preferred for making filters.

JUGLANS-JUGLANDACEÆ, WALNUT (LEAVES).

Dr. Negrier has written very strongly on the employment walnut leaves in the treatment of the various forms of scrof and gives the following summary of his experience. Of 56 pati treated, 31 were cured and had no relapse; 18 were remarka benefited; 4 derived no benefit, their sores being unaffected by 4 of the patients (children) died of hydrocephalus, pneumonia,

"The long-continued use of the walnut preparations never p duced any injurious effects. Their first effect is to increase energy of all the functions, and to promote digestion and circu tion; the muscles become firmer and the skin more ruddy.

"From the nature of the disease, the effects are sometimes slow appearing; and perseverance is indispensable sometimes for a lengthened period. When the remedy has failed, it has generally been from want of a sufficiently long trial. The remedy is applicable to strumous glands, open sores, caries of the bones, and especially to strumous ophthalmia. The constitution first improves, and then the local disease."

Preparations and doses.—Infusion, Decoction, Fomentation, Extract, and Syrup, according to the age and character of the patient. The dose is obviously subject to wide differences in a medicine which produces no bad effects, and must be continued in some cases for months.

Infusion.—A handful of leaves chopped up in three pints of boiling water. *Dose.*—A cupful three or four times a day. *Decoction.*—Stronger, chiefly used as an injection in fisculous sores, and as a fomentation. *Extract dose.*—Four ordinary-sized pills in a day. *Syrup.*—Seven grains of extract in an ounce of simple syrup, two or three tea-spoonfuls in a day for children.*

This remedy is so plentiful and cheap in many parts of England as to deserve a fair trial in hospital or dispensary practice.

KOUSSO, BRAYERA ANTHELMINTICA (Diœcia Icosandria; Rosaceæ).

Description.†—This drug, which has been lately introduced into this country as an anthelmintic, has long been in use in Abyssinia, for the expulsion of worms. It is obtained from a tree twenty feet high, and consists of the flowers simply dried and packed, the dried mass having a general greenish-yellow colour.

Composition.—Fatty oil; *acrid resin; volatile oil;* and a *crystalline* substance, termed *kwoseine.*

Medicinal properties.—It is one of the most efficient remedies for *tape-worms* with which we are yet acquainted, and its operation is not, in general, particularly disagreeable. It sometimes occasions a feeling of sickness, and, occasionally, even vomiting; but, in general, its operation is safe, easy, and certain, the worm being usually expelled in about twelve hours. It is often necessary to give a mild purgative in a few hours after its administration, as the kousso, even when it kills the worms, does not, in every case, act upon the bowels so as to expel them when dead. It sometimes, though rarely, causes considerable prostration. It does not always expel the head of the worm. It is frequently very much adulterated by admixture with leaves and stalks of other plants. "A parcel of kousso fell under my own observation, which in the skins as brought from Abyssinia weighed ninety pounds; but when properly picked and cleaned, weighed only fifty pounds."‡ When it fails, it is probably because sufficient has not been taken. ‘ officer who took ʒiv two or three times without success, then ℥jss, since which several months have gone by, and he has not troubled with any symptoms of a relapse.” *

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* Ed. Med. and Surg. Jour. Oct. 1850, p. 271, quoted in Braith. Retrosp. vol. xxi. p. 22.

† Paper by Pereira in Pharm. Journ. July, 1850.

‡ Vaughan, Braith. Retrosp. vol. xxv. p. 140.

Dose and administration.— ℥ss of the dried leaves are mixed about half a pint of tepid water, and allowed to stand for abou minutes; it is then to be stirred up, and the whole is to be s lowed in the morning, fasting. An aperient should be give about twelve hours.

MARANTA ARUNDINACEA, Arrow Root (Monandr Monogynia; Marantaceæ).

Description.— There are several kinds of arrow root.

West Indian, obtained from the Maranta arundinacea, by b ing the tubers to a pulp in cold water; pressing the juice thr coarse cloths, and allowing the fine powder to subside. This is best.

East Indian, obtained from the tubers of the Curcuma ang folia. It is generally in larger grains than West Indian, and not crackle under the finger; its price is not nearly so high.

Portland, obtained from the tubers of the Arum maculatum.

Brazilian (Tapioca, *E.*), obtained from the tubers of the Jan manihot, by rasping instead of bruising them, as in the West Ind When this is prepared by drying it upon hot plates, it beco granular, and is termed *tapioca*; which is officinal in the Edinbu Pharmacopœia.

Tahiti or *South Sea*, obtained from the root of the Tacca pin tifida by rasping it, as in the last case.

English is nothing but starch, obtained from potatoes in a sim way.

Composition.— These all agree in being merely modification the same vegetable proximate principle “*amylum*,” or *starch*.

Properties.— West Indian arrow root is distinguished from the rest by the hardness of its particles, which crackle when pre between the finger and thumb. They are all nutritious and en lient, and form unirritating articles of diet, for which purpose t are introduced into the Pharmacopœia.

MARRUBIUM VULGARE, Common White Horehoun (Didynamia Gymnospermia; Labiatæ).

Description and uses.— White horehound is a whitish, woo looking plant, about a foot or eighteen inches high. It is sligl *tonic* and *expectorant*, and is chiefly used as a domestic remed chronic coughs and catarrh, in which it is by no means with value. It is sometimes used as a domestic *emmenagogue*.

Doses, &c.— It is made into tea (ʒj to Oj of boiling water), is taken *ad libitum*. A syrup, also, is kept in the shops.

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* Vaughan, Braith. Retrosp. vol. xxv. p. 140.

MELISSA OFFICINALIS, Balm (Didynamia Gymnospermia; Labiatæ).

Properties and uses. — Slightly *diaphoretic.* *Stimulant* in hypochondriasis. It is seldom used medicinally, but as balm tea (a handful of the herb to a pint of boiling water) it is a popular remedy in fevers, and in lowness of spirits depending upon amenorrhœa or chlorosis.

MENYANTHES TRIFOLIATA, Buckbean (Pentandria Monogynia; Gentianaceæ).

Description.—This is one of the most beautiful of our indigenous flowers, and grows abundantly in most marshy grounds. It is a *bitter tonic and diuretic*, and, though seldom used by the profession, is a valuable remedy in atonic dropsies. The best form for administration is that of infusion (℥ss of the dried, or ℥j of the fresh plant to a pint of water).

Dose.— f℥j to f℥ij.

MUCUNA PRURIENS, Cowhage (Diadelphia Decandria; Leguminosæ, subord. Papilionaceæ).

Description.—The pods, which are the officinal part, are about four inches long, and half an inch broad; they are covered externally by short stiff brown hairs, and the pod itself has a brown colour.

Medicinal properties. — *Anthelmintic.* It acts as a mechanical irritant to the worms. The hairs are supposed to pierce the skin of the worms, and to cause so much irritation, that they writhe about until they lose their hold upon the alimentary mucous membrane, and become disengaged from the mucus, when they are easily expelled by the purgative which is to be given shortly after the administration of the cowhage. When the hairs come in contact with the human skin, they cause the most intolerable itching.

Uses.—As an anthelmintic, to expel *lumbrici* and *ascarides;* it has little effect upon teniæ. The worms are generally expelled alive.

Dose and administration.—The usual mode of administration is to plunge the pod into treacle, and scrape off the hairs and adhering treacle with a spoon or blunt knife; of this mixture one or two tea-spoonfuls should be given, and should be followed in a few hours by a dose of castor oil or some other purgative.

If the hairs accidentally come in contact with the skin, the itching is most effectually relieved by smearing the part with oil.

ŒNANTHE CROCATA (Pentandria Digynia; Umbelliferæ).

This plant is not used in medicine, but is introduced in this work because of its intensely poisonous properties. It is one of the few umbelliferous plants which possess hurtful powers.

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Composition.—It is chemically the same as starch.

Properties and uses.—It is simply a demulcent and nutritious article of diet, and being unstimulating, it is used in inflammatory and febrile affections.

SALIX (Caprea, *D. E.*; Alba, *D.*; Fragilis, *D.*), Willow Bark (Diœcia Diandria; Salicaceæ).

Remarks.—All the willow barks agree in their medicinal properties, which are *tonic* and *antiperiodic* and closely resemble those of cinchona, for which they form a valuable substitute. They are less liable to disorder the stomach, and are more available as general tonics than cinchona. They owe their powers to a vegetable alkaloid termed *salicin*, which is obtained by a process described at p. 192. It is not officinal, but has been used with great advantage in Guy's Hospital and other places, in the treatment of ague and other periodic diseases. It is given in doses of gr. ij to gr. x, either in powder, or dissolved by the addition of a few drops of dilute sulphuric acid.

The bark itself may be used in infusion or decoction, in the same cases as cinchona. It contains tannin, and it is therefore better to avoid prescribing it in combination with salts of iron.

Dose.—About three times that of cinchona.

SEMPERVIVUM TECTORUM, Houseleek (Nat. Ord. Crassulaceæ).

This plant, which grows abundantly upon walls and roofs, is so well known as not to require description. It is introduced in this work on account of its value in the treatment of eczema and porrigo in infants. When the entire leaves are bruised and mixed with cream and sulphur, they form a most soothing and valuable application.

Take of houseleek leaves, four or five; pound them, and mix them with a teaspoonful of flowers of sulphur, one or two teaspoonfuls of cream, and two drachms of lard. It soon spoils, and should therefore be kept in a cool place.

SPIGELIA MARILANDICA, Carolina Pink (Pentandria Monogynia; Spigeliaceæ).

Description.—The root, which is the officinal part, consists of numerous slender, branching, dark-brown fibres, issuing from a short, dark-brown rhizome. It is frequently mouldy. The plant is a slender herb, having superb, carmine-coloured flowers.

Medicinal properties and uses.—*Anthelmintic.* Though very little used in this country, it is highly esteemed in the United States. In very large doses it is said to produce convulsions, which may be entirely prevented by combining it with a purgative. In large doses it purges and causes vomiting. It should always be combined with a purgative, as senna. It is probable that its efficacy depends in some degree upon its freshness; for in this country it does not at all sustain the high reputation which it possesses in America.

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Dose.—ʒj to ʒij for an adult; gr. x to ʒss for a child, of
powdered root, made into infusion with senna, and taken
and morning, every other day, for a few days.

STAPHISAGRIA, Delphinium Staphisagria (Polyand Trigynia; Ranunculaceæ).

Description.—The seeds, which alone are officinal, are
brown, almost black, about three lines long and triangular, w
distinguishes them from all the medicinal seeds for which
might be mistaken. They are poisonous when swallowed, a
perty which they owe to an alkaloid, delphinia. They are n
used internally; but, when powdered and made into an ointn
or boiled (ʒjss in Oj), they are sometimes applied to kill
whence they are called by the Germans, louse-seeds.

THLASPI BURSA PASTORIS, Shepherd's Purse (Cruciferæ; Tetradynamia Siliculosa).

This very common herb is not officinal, but it is in common
mestic use in Germany as a remedy for menorrhagia, and it has
reported as having proved successful, after the failure of
potent astringents. A handful is boiled in a pint of water d
to half, and a tea-cupful is taken twice a day. It is not an unli
remedy in anæmial menorrhagia; the medicinal properties of
natural order to which it belongs being tonic, nutrient, and sti
lant to the digestive organs.

TUSSILAGO FARFARA, Coltsfoot (Syngenesia Polyg Superflua).

Description. — Coltsfoot bears a yellow flower, similar in gen
characters to the daisy tribe, which appears before the le
are much developed. The leaves are very large, roundish,
dark green. They frequently grow amongst stone-heaps, by
road-side.

Medicinal properties and uses. — Both the leaves and flowers
tain a mucilaginous and a bitter ingredient, upon which their
perties depend. Coltsfoot is *tonic* and *demulcent*, and though
effects are not very striking, and it is seldom used by med
men, it is a favourite domestic remedy for chronic catar
coughs.

Dose.—Of a decoction (made by boiling a handful of the p
in two pints of water), *ad libitum.*

ZINCI CHLORIDUM (Antidote for poisoning by).

Since the proper sheet was sent to press, an article on this sub
has appeared by Dr. Stratton, who refers to several cases of poi
ing by chloride of zinc, and strongly urges the importance of u
carbonate of soda or potash, or common soap as an antidote, ins
of eggs which have been employed and highly praised. He ass
valid reasons for the preference, and the cases which have hith
occurred support his choice. (*Ed. Med. and Surg. Jour.*, J
1854, p. 497.)

CLASSIFICATION OF REMEDIES.

In the following classification the remedies are arranged alphabetically, under the titles descriptive of their most prominent quality, or those by which they are generally known. No attempt has been made at scientific accuracy of arrangement, but convenience of reference has alone been consulted.

In selecting the characteristics attached to each substance, brevity has been carefully studied, which has occasioned the omission of some points that may, perhaps, be thought to be characteristic. The chief object has been to select that character which presents itself most prominently to the physician or the patient, or which requires most carefully to be noticed: for example, as characteristic of bichloride of mercury as an alterative, the very important properties of its poisonous nature and the smallness of its dose, have been selected to guide the practitioner; whilst in dulcamara, the unimportant one of its possessing a sickly taste has been adopted, because it is the only property which strikes the patient, no sensible effect being produced by its administration. For the complete description of properties, the student is referred to the accounts contained in the body of the work.

1. Alteratives.
2. Antacids.
3. Anthelmintics.
4. Antiperiodics.
5. Antiscorbutics.
6. Antispasmodics.
7. Astringents.
8. Carminatives.
9. Caustics and counterirritants.
10. Demulcents.
11. Diaphoretics.
12. Diuretics.
13. Emetics.
14. Emmenagogues.
15. Expectorants.
16. Febrifuges.
17. Narcotics, embracing anodynes and sedatives.
18. Parasiticides.
19. Purgatives.
20. Refrigerants.
21. Sialogogues.
22. Stimulants.
23. Tonics.

Ammoniæ murias - -	C
Antim. sulphuret. aureum	D
Arsenici chloridum -	D
" teriodidum -	Sm
Calcis murias - -	See
Cinnabar - - -	Ine p
Donovan's solution -	Sm
Dulcamara - - -	Sick
Elm bark - - -	Dia
Galium - - -	Noth
Guaiacum - - -	Disp
Hydrarg. et arsenic. iodidi liq.	Small
Hydrargyri chloridum -	Gripi
" bichloridum -	Poison *smal*
" biniodidum -	Less last.
" iodidum -	
Iodine - - - -	
Manganese - - -	- -
Mezereon - - -	Small d
Pitch - - - -	Stim.; d
Plumbi iodidum - -	Bulky;
Potassæ acetas - -	Of doubt
Potassii iodidum - -	See page
Sarsaparilla - - -	See page
Sassafras - - -	Nutritious

2. ANTACIDS.

Remedies which neutralise an excess of acid in the stomach or the urine. They are always objectionable in phosphatic deposits in the urine; and, in many cases, their continued employment aggravates the mischief they are intended to cure, which is more effectually remedied by tonics and acids. These, by improving the health, prevent the undue formation of acid, instead of simply neutralising it when already formed.

Name.	Characteristics.	Applications.
Ammon. sesquicarb.	Stimulating	Atonic dyspepsia.
Calcis liquor	Unirritating	Obstinate vomiting.
Creta	Astringent	Diarrhœa, from acidity.
Magnesia	Laxative	Constipation, with acidity.
Magnes. carb.	Ditto	„
Magnes. bicarb. (fluid)	Agreeable laxative	„
Potassæ acetas	Neutral, but becoming alkaline in the system before reaching the kidneys; diuretic.	Never used *as* an antacid.
„ carbonas	Sometimes irritating	Dyspepsia.
„ bicarb.	Less nauseous and irritating.	„
„ liquor	More powerful	„
„ „ efferves.	Agreeable	„
„ tartras	See Potassæ Acetas. Antacid in the urine, not in the stomach.	Only used as an aperient.
„ bitartras	Laxative; diuretic	Not used *as* an antacid.
Sodæ carbonas	Nauseous; irritating	Dyspepsia.
„ bicarbonas	Destroys the taste of Epsom salts.	„
„ liq. efferves.	Agreeable	„

3. ANTHELMINTICS.

Remedies which expel intestinal worms; from ἀντὶ, against, ἕλμινθος, a worm: sometimes called vermifuges, from *vermis*, a worm, and *fugo*, to put to flight.

Tonics, rhubarb, and alkalies, &c., prove frequently the best anthelmintics, by removing the morbid state of body, and the unhealthy secretions, which favour their production. Attention to the diet in children is essential, to prevent over-feeding.

Absinthium	Of doubtful value	See Append.—Absinth.
Calomel	Acts only as a purgative	Small thread worms.
Camboge	„	„
Filix mas	Must be followed by a purgative.	Tæniæ and lumbrici.
Filicis maris oleum	Nauseous, efficient	Tæniæ.
Ferri ramentura	Cause offensive eructations	Tæniæ.
Granati radix	Sometimes emetic; less offensive than turpentine.	Tæniæ.
Jalap	Acts only as a purgative	Ascarides.

Anthelmintics—continued.

Name.	Characteristics.	Applications.
Kousso - - -	Very efficient - - -	Tæniæ.
Mucuna - - -	Not unpleasant to children	Lumbrici.
Ol. Chenopodii vel Santonicæ.	Small dose; not disagreeable.	All kinds of worms.
Ruta - - - -	Efficient; dangerous in an over dose.	Ascarides and lumbrici.
Santonine - - -	Efficient; small dose -	Round worms.
Spigelia mariland. - -	Sometimes emetic; should always be *combined* with a purgative.	All kinds of worms.
Stannum - - -	Of doubtful value - -	Almost obsolete.
Tanacetum vulgare -	- - - - - -	A popular remedy fo worms.
Terebinthinæ oleum -	Certain; nauseous - -	Tæniæ.

4. ANTIPERIODICS.

Remedies which remove diseases that occur at stated periods, of whi ague and neuralgias are the chief.

Acid. arseniosum - -	Cheap; poisonous: often of great value.	Ague, periodical headache &c.
Acorus - - -	Cheap, aromatic; not so powerful as quinine. Often useful.	Ague.
Acupuncture - -	Painless, inexplicable, p.449.	Neuralgia and rheumatism
Bebeerine - - -	Cheap; affects the head less than quinine.	Ague and neuralgias.
Bougie - - -	Acts mechanically - -	Only in ague dependent upon stricture of the urethra.
Cinchona - - -	More aromatic than quinine. All the varieties are of nearly equal value.	Ague and neuralgias.
Ferrum, and its preparations.	The carbonate is the most efficacious form.	Tic douloureux; not by itself in ague.
Lilac (common) syringa -	See p. 172. - - -	Ague.
Narcotine - - -	Equal to quinine (?) -	Ague (Dr. O'Shaughnessy).
Olive leaves and Nat. Ord. Oleaceæ.	See p. 172. - - -	Ague.
Phyllerine - - -	„	„
Piperin - - -	Comparative cheapness -	„
Potassæ acetas - -	See p. 559. - - -	Imperfect or "dumb" agu
Quinidine - - -	Similar to quinine (?) -	Ague and neuralgias.
Quinine (amorphous) -	Cheap, as powerful as the next (?)	Ague and neuralgias.
Quinæ sulphas - -	See Quin. Disulph., p. 182.	„
„ disulphas - -	- - - - - -	„
Quinæ et ferri citras -	Peculiarly useful - -	Neuralgias.
Salix - - - -	Cheap; about ¼ as powerful as cinchona.	Ague.
Salicine - - -	Ditto, compared with quinine.	„
Zinc, oxide - -	No sensible effects - -	Chiefly in tic douloureux
„ sulphate - -	Emetic in over-dose.	„

5. ANTISCORBUTICS.

Remedies which prevent or cure scurvy.

Name.	Characteristics.	Applications.
Vegetable acids and juices generally.	- - - - - - -	Scurvy.
Acid, citric - - -	Not equal to lemon juice	„
Lemon juice - - -	The most efficacious -	„
Lime juice - - -	Nearly, if not quite equal	„
Oxalis acetosella - -	Pleasant as a salad - -	„
Potatoes - - -	Useful, either cooked or raw.	„
Rumex - - -	May be eaten as salad -	„
Saltpetre and vinegar -	Generally at hand on shipboard.	See p. 565.

6. ANTISPASMODICS.

Remedies which remove not only spasms, such as cramp, or colic, but also any involuntary motions, such as in chorea.

Æther sulphuric - -	Very powerful; general stimulant.	Colic and spasmodic pains generally.
Allium sativum - -	Unpleasant smell - -	Spasms of hooping-cough; not as a general antispasmodic.
Alum - - - - -	Purgative in large doses -	Only in painter's colic.
Ammonia (spirit) - -	Transient effects - -	Hysteria and colic.
Argenti nitras - -	Powerful in small doses; liable to discolour the skin.	Only in chorea and epilepsy.
„ oxydum - -	Not liable to this objection (?).	Same cases.
Assafœtida - - -	Offensive; laxative - -	Hysterical spasmodic affections.
Brandy and spirits -	Agreeable - - - -	Colic.
Cannabis Indica - -	Small dose; causes intoxication. See p. 311.	Tetanus.
Cajuput oil - - -	Diaphoretic - - -	Colic. Seldom used.
Castoreum - - -	Of doubtful value - -	Gout in the stomach.
Chloroform - - -	Causes unconsciousness -	See Chloroform, p. 144.
Coccus - - - -	Of doubtful value - -	Spasms of hooping cough.
Coffee - - - -	Agreeable flavour - -	Spasmodic asthma. Hooping cough, p. 826.
Cotyledon - - -	Not sufficiently proved -	Epilepsy.
Crocus (saffron) - -	Of doubtful value - -	Hysteria.
Cupri ammon.-sulph. -	Emetic in over-dose - -	Only in chorea.
Ferri muriatis tinct. -	Tonic - - - -	Only in spasmodic stricture.
„ valerianas - -	Offensive; powerful - -	Hysteria.
Friction, with hot or soothing applications.	Always at hand - - -	Colic.
Galbanum - -	Weaker than assafœtida -	Hysterical spasmodic affections.

Opium	
Quinæ valerianas	
Sagapenum	
Ruta	
Salt heated in the oven	
Spt. æth. sulph.	
Stramonium	
Sumbul	
Valerian	
Volatile oils, especially peppermint.	
Zinci oxydum	
„ sulphas	S
„ valerianas	C

7

Remedies which check blee

Acids generally, especially sulphuric.	Re
Alum	Re
Antim. potas. tart. (?)	Ver
Argenti nitras	At nl
Arsenious acid	
Bael	Sma
Bismuthi nitras	Effic
Blackberry tea	See p

Astringents — continued.

Name.	Characteristics.	Applications.
Catechu	Simply astringent; irritant, if too long continued.	Chronic diarrhœa.
Chiretta	Disagreeably bitter	Ditto.
Chloropercha	Ease of application	Superficial wounds.
Cinnamon (bark)	Aromatic stimulant	Boiled in milk, in ditto.
Cobwebs	Generally at hand	Hæmorrh. from wounds.
Cold	The success depends on the *mode* of application.	Ext. and int. hæmorrh., especially uterine.
Collodion	See p. 284.	Most diversified, p. 284.
Creasote	Inhaled, p. 799.	Spasmodic respiration in phthysis.
Creta	Absorbent powder	Diarrhœa and suppurating surfaces.
Cupri sulphas	Irritating; painful	Suppurating surfaces; *chronic* diarrhœa.
Cusparia	Tonic	Only in chronic dysentery.
Ergota	Sometimes emetic and griping.	*Uterine* hæmorrhages.
Ferri mur. tinct.	Very powerful; tonic	Principally ext. hæmorrh. and menorrhagia.
Galls	Powerful	Chiefly mucous discharges and piles; used topically.
Gallic acid	- - - - - - -	Chiefly in *remote* hæmorrhages, pp. 83. 118.
Granatum	Simply astringent	Pur. and mucous disch. and hæmorrh.
Hat-down	Always at hand	Small wounds.
Hæmatoxylon	Not unpleasant; unirritating, even if long continued.	Chronic diarrhœa and dysentery.
Kino	Simple astringent	"
Krameria	"	"
Matico	Said to be *very* powerful	*Ext.* and int. hæmorrh.
Myrrh	Expectorant	Excessive bronchial secretion.
Myristica	Aromatic; stimulating	*Chronic* diarrhœa.
Nux vomica	Small dose; poisonous	Atonic diarrhœa. See p. 331.
Opium	Narcotic	Diarrhœa and dysentery.
Pareira	Diuretic (?)	Purulent or mucous urine.
Plumbi acetas	Reduces the circulation; very valuable.	Ext. and *int.* hæmorrh.; diarrhœa; suppur. sores.
Position	Sometimes sufficient by itself.	Most cases of discharge of blood.
Pressure	Value depends upon mode of application.	Wounded veins; uterine hæmorrh.; old ulcers, &c.
Pterocarpus	Simple astringent	Chronic diarrhœa.
Quercus	"	Topically, in excessive discharges.
Rhubarb	Acts, at first, as an aperient	Diarrhœa.

Astringents — continued.

Name.	Characteristics.	Applications.
Rose leaves	Feeble ; agreeable	Trifling cases.
Simaruba	Stim. diaphoretic	Only in chronic dysent
Sulphuric acid	Peculiarly useful	Choleraic diarrhœa, p.
Tannic acid	- - - - - -	*Topical* hæmorrhages, p.
Tannin	Small dose	Profuse sweating, p. 11
Tormentilla	Not disagreeable to children when taken with milk.	Chronic diarrhœa ; and topically, in prolapsus
Turpentine (oil)	Offensive	Internally in hæmorr and externally in wou
Uva ursi	Diuretic (?)	Purulent or mucous uri
Zinci acetas	Gives less pain than the sulphate ; not constipating.	Chiefly topical ; but internally, in profuse swea
Zinci oxydum	Most efficient of the zinc compounds.	Sweating of phthysis, p.
Zinci sulph.	Gives considerable pain	"

8. Carminatives.

Remedies which relieve griping. (See the *Table of Volatile O* p. 635.)

9. Caustics and Counter-irritants.

Remedies which chemically destroy or burn the animal tissues, and su as excite heat, redness, or inflammation, when locally applied.

Abietis resina	Rubefacient	Externally, as pitch plaste in chronic coughs.
Acid. acet. fort.	Rubefacient ; epispastic	Is used to raise a speed blister.
Acid. nitricum	Easy application ; gives little pain (?)	Setting issues ; phagedenic ulcers.
Acid. sulphuric.	Very powerful	In chronic affections of th joints ; never used as caustic.
Actual cautery	On the whole, the least painful mode of forming an issue.	For setting issues.
Ærugo	Stimulating	Only to languid ulcers.
Alum. exsiccat.	Applied dry, in powder	Fungous granulations.
Ammoniæ liq. fort.	Destroys the cuticle when applied undiluted.	See Am. Liquor, pp. 1 793.
Antimonii chloridum	Speedy ; liable to run	Malignant ulcers.
Antim. tart.	Produces large deep pustules.	Chronic inflammatory affections.
Argenti nitras	Never produces a slough ; is vesicant.	See Arg. Nitr., p. 405.

Caustics—continued.

Name.	Characteristics.	Applications.
Arsenious acid	Poisonous	Lupus and cancer.
Cantharis	Causes strangury	See Empl. Canth., p. 289.
Capsicum	Only rubefacient	Never used *as* a rubefacient.
Chloroform	Sometimes causes a superficial slough.	Never used for this purpose.
Creasote	Weak caustic	Only used as a caustic for decayed teeth.
Croton oil	Causes smaller pustules than tartar-emetic.	Chronic coughs and inflammatory affections.
Cupri sulphas	Never causes a slough	Flabby ulcers, &c.
Firing	Singular efficacy	See p. 448.
Galvanic cautery	Efficacious, troublesome, expensive.	Fistulous openings, p. 449.
Iodine	Powerful counter-irritant; easily applied; very painful for a few minutes.	Infantile hip disease, and chronic ophthalmia.
Hydrarg. nitrico-oxydum	Causes acute pain for a short time.	Languid ulcers, rupia, and chronic ophthalmia.
Hydrarg. oxyd. rubr.	"	"
Moxa	Slow, and very painful	For setting issues.
Mustard	Rapid effect; it sometimes causes sloughing.	Local pains not severely inflammatory.
Potassa fusa	Very painful	See Potassæ Hydras.
Potassa cum calce	Slower, but less painful	"
Resina	Never causes sloughs	Applied as an ointment, to keep up suppuration.
Sabina	"	"
Terebinth. oleum	Very burning pain in about twenty minutes	See Tereb. Oleum, p. 616.
Zinci chloridum	Sure, but slow, and very painful.	Cancerous affections only.

10. Demulcents.

Simple remedies which allay irritation by their local (?) soothing properties.

Acacia	Mere demulcent; agreeable	Tickling coughs.
Althæa	"	"
Amygdala	"	Tickling coughs, and dysentery.
Amylum	"	Not used in coughs; chiefly as an enema in dysentery.
Avena (gruel)	Laxative	Is applied, as gruel, to irritable skin.
Bran tea	Very agreeable diaphoretic	Painful, irritable cough of influenza.
Cetaceum	Sickly in over-dose, and not often used internally	Inflammation of stomach or bowels, &c.
Cetraria	Tonic	Phthysical cough, and chronic bronchitis.
Cydonia	Soothing	Only used externally.
Figs	Griping; laxative	Catarrh.

Hordeum -
Horehound -
Linseed tea -
Malva - -
Mel - -
Oxymel -
Sambucus -
Sevum - -
Tragacanth -

Agents which excite

Ammon. acet. liq. -
Antim. oxyd. -
" pulvis -
" potas.-tart.
Bran tea - -
Cold wet sheet -
Cold water draught when in bed
Dover's powder - -
Guaiacum - - -
Hot bath - - -
James's powder - -
Inula - - - -
Ipecacuanha - -

12. Diuretics.

Remedies which cause an increased secretion of urine. As a class they are injurious, with one or two exceptions (see List), in suppression of urine dependent upon inflammation of the kidneys. It is highly important that diuretics, and *especially saline* ones, should be accompanied by large quantities of liquid. The amount of fluid in which a saline is dissolved, will frequently determine whether it acts as a diuretic or an aperient. As a general rule, the quantity of a salt should *not exceed a scruple to the fluid ounce* of *solvent*, when it is intended to act as a diuretic. For some important hints on this subject see *Bird's Urinary Diseases*, ed. 4. ch. xiv.

Name.	Characteristics.	Applications.
Barley-water	Demulcent	Gonorrhœa and strangury.
Bleeding	- - - - - - -	See "Cupping the Loins."
Broom	- - - - - - -	See "Scoparium," below.
Buchu (?)	Astringent	Catarrh of bladder.
Cantharides	Uncertain; often highly irritant.	Probably none, as a diuretic.
Copaiba (?)	Nauseous	Only in gonorrhœa.
Cupping the loins	- - - - - - -	Suppression of urine from inflammation of the kidneys.
Digitalis	Depressing	Almost all forms of dropsy.
Elaterium (?)	Hydragogue cathartic	„
Gin	Stimulating	Anasarca in old persons.
Hot bath	- - - - - - -	Suppression of urine from inflammation.
Juniper	Stimulating	Not used alone.
Menyanthes	Tonic	Atonic dropsies.
Pareira (?)	Astringent	Same as Buchu.
Potassæ acetas	Laxative	Anasarca rather than ascites.
„ bitart.	Laxative; refrigerant	All forms of dropsy.
„ nitras	Poisonous in very large doses; depressing	„
Sambucus, juice of fresh root.	Sometimes emetic	General cases.
Scilla	Nauseating; efficient	Generally combined with blue pill.
Scoparium	One of the most valuable	All forms of dropsy.
Spirits generally	Stimulating	Seldom applicable as diuretics.
Spt. æth. nitr.	Diaphoretic	Anasarca.
Turpentines (all)	Stimulating	Old or debilitated patients.
Uva ursi (?)	Astringent	Same as Buchu.
Warm draughts	- - - - - - -	Should accompany all the others.
Wines	Stimulating	Seldom applicable as diuretics.

Ammon. sesqui
Anthemis
Antim. tart.
Cupri sulphas
Ipecacuanha
Lobelia
Mustard
Salt and water
Squill
Tickling the inside
throat with a feat
Tobacco
Warm water
Zinci sulphas

Note.— Emetics sometim
mucus. Any vegetable acid,
operate.—*Sir G. Lefevre, La*

Agents wh

Aloes
Ammoniacum
Assafœtida
Bleeding

Emmenagogues — continued.

Name.	Characteristics.	Applications.
Hyoscyamus - -	Anodyne - - - -	Dysmenorrhœa.
Iodine - - - -	Disputed by some persons	Scrofulous disordered menstruation.
Leeches to the os uteri -	- - - - - - -	Dysmenorrhœa from congestion.
Manganese - - -	See p. 525. - - - -	"
Marjoram - - -	Carminative - - -	Popular remedy in chlorosis.
Mentha pulegium - -	Carminative - - -	Only a popular remedy.
" viridis - -	"	"
Myrrh - - - -	Tonic - - - -	Chlorosis.
Rosemary - - -	"	"
Ruta and the vol. oil -	Acrid narcotic; powerful; poisonous in over-doses.	Might be used oftener with advantage as a stimulant emmenagogue.
Sabinæ oleum - -	One of the most efficient?	Chlorosis; or simple amenorrhœa.

15. Expectorants.

Remedies which assist the expulsion of secretion from the lungs: an object sometimes effected by removing an inflammatory condition which suppresses the natural secretions, as in the first stage of bronchitis, in which there is severe cough and little expectoration; at other times, by stimulating the system, and assisting the simple expulsion of the bronchial secretion, as in the case of a common catarrhal cough with debility; and at others, again, by checking the secretion when it is excessive without any active inflammation, as in the case of chronic coughs of old people, with great expectoration. There is, therefore, a wide difference amongst the various expectorants, the term being, perhaps, more vague than that of any other general class of remedies; but as a general rule, it may be said that when the cough is *tight*, and it is difficult "to get up the phlegm," and this is *scanty or of a watery* character, nauseating expectorants must be used, such as antimony or ipecacuanha; when, on the contrary, the cough is tolerably loose, and the expectoration is thick and copious, as in old people, stimulating expectorants, such as myrrh, benzoin, and sulphate of zinc, are most useful: whilst, in ordinary coughs, unmarked by any very prominent symptom, squills and paregoric are chiefly employed.

Acid. benz. - - -	Stimulating - -	Bronchitis in old people.
Ammoniacum - -	"	"
Antim. tart. - - -	Nauseating; depressing -	*Not* in the above. To be used in *tight* coughs.
Assafœtida - - -	Stimulating - - -	Chronic bronchitis in old people.

Expectorants — continued.

Name.	Characteristics.	Applications.
Balsam of Peru	Stimulating	Chronic bronchitis in people.
„ Tolu	„	„
Benzoin	„	„
Camphor (tinct. co.)	Stimulating and narcotic	Chronic bronchitis in people, and generall coughs without b chitis.
Cetraria	Tonic	Phthysis, and bronch with exhaustion.
Creasote	Only when inhaled	Phthysis, p. 799.
Digitalis	Diuretic	Pituitous asthma of people.
Galbanum	Less powerful than ammoniacum.	Chronic bronchitis.
Garlick	Stimulant; diuretic	Pituitous asthma of people.
Horehound	Demulcent	Chronic coughs.
Ipecacuanha	Nauseating	Most coughs, inflamm tory or not so; not u ful in *chronic* bronch in old people.
Lobelia	„	Suffocative bronchitis children.
Marjoram	Stimulating	Popular remedy for chr nic coughs.
Myrrh	Checks mucous secretions	Chronic bronchitis in people.
Naphtha (medicinal)	Tarry flavour	Chronic bronchitis.
Oxymel	Laxative	“ Cuts the phlegm.”
Pyroacetic acid Pyroxylic spirit	Tarry flavour	Chronic bronchitis phthysis.
Scilla	Nauseating; diuretic	Most non-inflammato coughs.
Senega	Slightly stimulating; emetic in an over-dose.	The *latter* stage of bro chitis or pneumonia.
Styrax	Stimulating	Chronic coughs.
Tussilago	Tonic	Chronic catarrhal cough

16. FEBRIFUGES.

Remedies which cure febrile diseases, or palliate the heat, thirst, which accompany many fevers and other diseases in which “fev ishness” is present.

Acids generally	Agreeable	To allay heat and thirst.
Acorus	Agreeable—feeble ?	Ague in Norfolk.
Ammon. acet. liquor	Of feeble and uncertain powers.	Most cases of feverishne
Ash (fraxinus) bark	Probably undervalued	Intermittent fever.
Arsenic	Small dose, cheap, efficacious	Only in ague.

Febrifuges — continued.

Name.	Characteristics.	Applications.
Barley water	Ad libitum ; sickly	Allays thirst.
Bebeerine	Cheap, efficacious	Ague.
Berbena	Remarkably efficacious (?)	Yellow fever, p. 825.
Citric acid	See "lemon juice" below.	
Cinchona bark	Most important of them all	Ague.
Cinchonia	Probably same as quinine	"
Lemon juice	Agreeable ; efficacious	Rheumatic fever.
Lilac (common) bark	Chiefly in popular use in Normandy.	See p. 172.
Mulberry	Agreeable	Allays thirst.
Narcotine	Efficacious; equal to quinine?	Ague, see p. 767.
Oleaceæ (nat. ord.)	Efficacious	" see p. 172.
Olive leaves	Remarkably efficacious ; cheap in some places.	" see p. 172.
Opium	See pp. 775, 776.	Puerperal fever, ague, rheumatic fever.
Phyllerine	See p. 172.	See p. 172.
Piperin	Cheaper (?) than quinine	Ague.
Potassæ acetas	Acts upon the secretions	Imperfect "dumb" ague ; rheumatic fever.
Quinidine	One third (?) as strong as quinine.	Ague.
Quinine	Most generally used	Ague and typhus? see p. 183.
Salicine	One third as strong as quinine ; cheap.	Ague.
Salines generally	Abate heat and thirst	Feverishness of all kinds.
Spirit. æther. nitr.	Stimulating, diuretic	"
Tamarind	Agreeable ; laxative	"
Wet sheet	See any work on hydropathy	Scarlatina and simple fever.
Willow bark	Efficacious	Ague.

17. NARCOTICS; embracing ANODYNES, HYPNOTICS, and SEDATIVES.

Narcotics are remedies which produce a certain amount of stupor, and are often followed by cessation of pre-existing pain, and by the excitement of headache. *Anodynes* (*α, privative ; ὀδύνη*, pain) are remedies which allay pain, without necessarily producing stupor. *Hypnotics* (*ὕπνος*, sleep) are remedies which produce sleep, whether accompanied by stupor or not. *Sedatives* are such agents as allay undue excitement of any description.

Acid. hydrocyanic. dil.	Slightly depressing	Not an anodyne for pains in general.
Aconitum	Acting locally as well as generally.	Neuralgic pains.
Acupuncture	Inexplicable, p. 449.	Neuralgias.
Amygdala amara	Those of Prussic acid	Chiefly in gastrodynia.
Arsenious acid	Small dose ; poisonous	Only in cancer of the uterus.

Narcotics—continued.

Name.	Characteristics.	Applications.
Belladonna	Causing cheerful delirium	Local rather than ger
Bismuth	Tonic	Only in gastrodynia.
Brushing the hair with a soft brush.	Causes sleep	Restless infants.
Camphor	Difficult to describe	See Tinct. Camph. co.
Cannabis	Not yet fully tested	Tetanus and general p
Chloroform	Destroys consciousness	See Chloroform.
Cocculus	Intoxicating	Not used internally.
Codeia	Uncertain in its effects	Same as morphia.
Colchicum	Depressing	Gout and rheumatism.
Conium	Unstimulating	See Ext. Conii, p. 320.
Creasote	Not easily defined	Obstinate vomiting.
Digitalis	Sedative; diuretic	Not used to allay pain.
Firing	Singular efficacy	Rheumatism, &c., p. 44
Hyoscyamus	Anodyne; hypnotic (?)	See Ext. Hyoscyami, 327.
Lactucarium	Sedative; hypnotic	Sleeplessness with exc ment.
Lauro-cerasus	Those of Prussic acid.	
Lobelia	Nauseating	Anodyne in spasmo asthma.
Lupulus	Hypnotic	Seldom used.
Morphiæ acetas	Causes sweating	See Morphiæ Acetas.
„ murias	Less liable to cause sweating	See Morphiæ Hydrochlo
Opianine	Not sufficiently tested	Same as morphia, p. 769.
Opium	Type of narcotics	Innumerable.
Papaver	Similar to opium, but weaker.	Coughs; and for you children.
Shower bath	-	Often induces sleep.
Spt. æth. sulph. co.	Stimulating	In low fever, with mutt ing delirium.
Staphisagria	Narcotic	Externally; to kill lice.
Stramonium	„	Smoked in spasmodic asth
Tobacco	-	Toothache, and pain in t stomach, &c.
Veratria	Least powerful local anodyne.	Local neuralgias.
Veratrum	Acrid narcotic emetic	Seldom or never used.

18. PARASITICIDES.

This term, which is now coming into fashion, means "agents capal of destroying parasites," and is applied to a class of substances whi destroy the low forms of vegetable growth, which are the foundati of some peculiarly obstinate diseases. Thus porrigo, or Tinea capit has been shown to be owing to the growth of a multitude of spor of the lowest forms of vegetables, around the roots of the hair a elsewhere; and such agents as prevent the development of the spores, are termed "parasiticides." So also a peculiarly obstinate form of vomiting is owing to the presence of another vegetable growth in the stomach, and the medicine which checks that process is designated by the same name. "Anthelmintics" might with propriety be called by the same title, but it has not as yet been extended to them. The substances included under this head are at present very few.

Name.	Characteristics.	Applications.
Acid. sulphurosum -	See p. 116. - - -	Tinea.
Sodæ hyposulphis - -	„	„ see also p. 602.
„ sulphis - - -	„	„ p. 603.

19. Purgatives.

Purgatives are divided into—
Cathartics, which are strong purgatives;
Hydragogue cathartics, which cause watery stools; and
Aperients and laxatives, which are mild purgatives.

Aloes: all kinds - -	Slow; acting on the rectum	General purgative, except in piles.
Alum - - - - -	Anodyne - - - -	Only in painters' colic.
Amygdalæ oleum - -	Gentle laxative - -	Infants.
Antim. potas.-tart. - -	Nauseating - - -	In obstruction or constipation from deficient secretion of mucus. See p. 400.
Assafœtida - - -	Laxative; causing offensive eructations.	Flatulent constipation in women.
Avenæ - - -	Laxative - - - -	Only as an article of diet.
Bleeding - - -	- - - - - - -	Obstinate constipation, which has not yielded to ordinary remedies.
Calomel - - -	See Hydrarg. Chloridum	General purgative; but only when combined with others.
Camboge - - -	Hydragogue; drastic; causing griping.	Not used alone: never in inflamed bowels.
Cassia - - - -	Gentle laxative -	Children. Not used alone.
Coffee (strong at breakfast).	Diet - - - - -	Sluggish bowels.
Colchicum - - -	Depressing; emetic -	Not used as a purgative, except in rheumatism.
Cold hip bath - -	May be used daily - -	Habitual constipation. Consult any respectable work on the "cold water cure."
Colocynth - - -	Cathartic; certain - -	General purgative, except with inflamed bowels.
Croton oil - - -	Very powerful; small dose, sickly.	Obstinate constipation and diseases of the brain.
Elaterium - - -	Efficient hydragogue -	Dropsies of all kinds.
Enemas - - -	Quick; certain - -	Obstinate constipation.

Purgatives — continued.

Name.	Characteristics.	Applications.
Figs	Griping; laxative	Sluggish bowels in ch
Friction over the liver	Often effectual	,, in
Hellebore	Drastic; hydragogue	Obsolete; in mania.
Hydrarg. cum cretâ	Gentle alterative	Children; and in typ
Jalap	Sweet; sickly; hydragogue	Children; dropsies.
Linum catharticum	Bulky	Only in popular use.
Magnesia	Gentle aperient; antacid; bulky.	Flatulent griping. r than constipation.
Magnes. carb.	,,	,,
,, sulphas	Nauseous; efficient; causing watery stools	In almost all cases cept extreme prostr or habitual constipa
Manganese sulph.	Gentle? drastic? p. 527.	Like salts.
Manna	Laxative; sickly; sweet, not unpleasant.	Chiefly in children.
Mulberries	Refrigerant laxative	Febrile affections.
Ox gall	Not easily characterised	Habitual constipation.
Potassæ acetas	Mild diuretic	In dropsies.
,, bisulph.	Acid; refrig.; laxative	,,
,, bitart.	Refrig.; diuretic; ultimately alkaline.	,,
,, sulphas	Tasteless; laxative; not easily dissolved.	Women and children.
,, tartras	Griping, laxative	General cases.
,, et sodæ tart.	,,	,,
Prunes	Laxative; agreeable	As diet in slight consti tion.
Rhamnus	Drastic; hydragogue; dangerous.	Only in dropsies in yo and robust patients.
Rheum	Tonic; causes subsequent constipation	Generally where a pow ful purgative is not quired. Not the best habitual constipation.
Ricini oleum	Quick; certain; sickly	Never causes inflammat
Treacle	Laxative	As diet, in habitual c stipation.
Sapo durus	Increases the solubility and power of vegetable purgatives.	Not used alone, except enemas.
Scammony	Slight taste; certain; griping.	General use.
Senna	Griping; certain; not followed by constipation.	Seldom used alone. Va able in habitual con pation.
Sodæ murias	Large dose; emetic	Seldom used except enemas.
,, phosphas	Slight taste; gentle	Infants and children.
Sodæ sulphas	Bitter; efficient	Formerly used instead Epsom salts.
Sulphur	Mild; certain; not followed by constipation.	Constipation, with piles.
Suppositories	Generally efficient, from their unpleasantness.	Only in constipation children from indolenc

Purgatives — continued.

Name.	Characteristics.	Applications.
Tamarind	Refrigerant; laxative	Fevers.
Taraxacum	Sweetish; alterative; not to be trusted alone.	Torpid liver.
Tobacco	Used in the form of smoke	Its disuse causes constipation in some habitual smokers.
Terebinth. oleum	Quick; certain; nauseous; anthelmintic.	Flatulent constipation and worms.
Viola	Pleasant laxative	Infants.
Wet abdominal bandage	Agreeable	See Cold Hip Bath, antè.

20. Refrigerants.

Cooling remedies, which abate thirst or unnatural heat.

Acetosella	Antiscorbutic	Fevers.
Acetum	- - - - - - -	External rather than internal.
Acid. citric.	Practically alike in properties.	Febrile affections.
„ muriatic.		
„ nitric.		
„ phosphoric.		
„ sulphuric.		
„ tartaric.		
Ammon. murias	Not refrigerant internally	As a lotion, with spirit, &c.
Lemons	Agreeable	Fevers, &c.
Oranges	„	„
Mulberry	Laxative	„
Plumbi acetas	Checks profuse sweats	Externally, in superficial inflammations.
Potassæ bitartras	Laxative; diuretic	Febrile states.
„ nitras	Depressing; diuretic	Not in *low* fever, even with heat of skin.
Rosa centifolia	Slightly laxative	Febrile states.
„ Gallica	Slightly astringent	„
Rumex	Antiscorbutic	„
Spirits	Cold from evaporation	Evaporating lotions.
Spt. æth. nitrici	Uncertain; diuretic	Feverishness.
Tamarind	Laxative; pleasant	Fever.
Tepid sponging	Better than cold sponging	Fever in all stages; except that of *extreme* prostration.
Hot sponging	Very efficient; checks subsequent profuse sweating	In excessive heat, after violent exercise.

21. SIALOGOGUES.

Agents which cause an increased flow of saliva.

Name	Characteristics.	Applications.
Armoracia	Immediate effect	Paralysis of the tongu relaxation of the uv
Mercurials	Excite sloughing, as well as mere flow of saliva.	Never used purposel sialogogues.
Mezereon		Not used as a sialogog
Pyrethrum	Immediate effect	See Armoracia.
Tobacco	Sedative	Not used as a sialogog

22. STIMULANTS.

Stimulants speedily increase the frequency of the pulse and the of the body; but their effect soon goes off; and they require quent repetition.

Æther. sulphuric.	Diffusible	Seldom or never used.
Alcohol	,,	See Spirits, below.
Ale	Slightly laxative	See Tonics.
Ammon. carb.	Diaphoretic; unpleasant	In low fever.
Ammon. arom. spt.	Aromatic; agreeable	Faintness from exhausti
Camphor	Not easily described.	See p. 735.
Capsicum	Pungent	Dyspepsia; weak digesti
Cassia (bark)	Aromatic; astringent	Prostration from diarrhœ
Cinnamon	,,	,,
Chloric ether	Pleasant, of doubtful efficacy.	Low fever.
Daucus carota	Used externally	Only to sloughing ulcers.
Ergota	Not a general stimulant	Only stimulant to the uter
Lavender	Agreeable (?)	In faintings.
Porter	More liable to affect the head than ale.	See Tonics.
Spirits — brandy	Constipating; heating; most powerful.	Low fever.
,, gin	Diuretic	Low fever; and generally for gin drinkers.
,, rum	Expectorant (?)	Seldom given medicinally.
,, whisky	Simple stimulant	Fever, &c., in those accustomed to its use.
Spt. æther. sulph.	Rapid; powerful; diffusible	Low fever; and fainting from exhaustion.
Wines — Madeira	Acid; mild	Impaired digestion from chronic diseases, as abscess, &c.
,, sherry	Not constipating	,,
,, port	Slightly astringent; most frequently used.	Low stage of fever.

23. TONICS.

Remedies which increase the "tone" and vigour of the body; they produce their effect more slowly than stimulants, but it is more permanent: they are liable to cause headaches if commenced too soon. It is not always easy to draw an exact line between a stimulant and a tonic.

Name.	Characteristics.	Applications.
Acids (mineral)		Not given alone.
Acorus	Aromatic; mild	Gen. tonic; and in ague.
Ærugo	Emetic	Only in chorea.
Ale or beer	Affects the head less, the bowels more, than porter	In the convalescence, rather than the progress of fever.
Angelica	Mild; aromatic	Placebo.
Anthemis	Bitter; nauseous; emetic	Dyspepsia; not general tonic.
Argentum	See p. 405.	Chorea and epilepsy.
Armoracia	Stimulating; diuretic	Atonic dyspepsia.
Arnica	See p. 728.	
Arsenious acid	Poisonous	See Arsenious Acid, p. 422.
Aurantium	Mild; bitter; agreeable.	Adjunct to bitter tonics.
Bebeerine	Less liable to cause headache than quinine.	Same as quinine, see p. 167.
Buchu	Checks mucous secretions	Only in urinary diseases.
Calumba	Bitter; slightly astringent (?).	General tonic.
Canella	Stimulating; aromatic	As a condiment or stimulant.
Caryophyllus	Aromatic; stimulant; astringent.	Incompatible with iron. Used in chronic diarrhœa.
Cascarilla	Aromatic; slightly stimulating.	General stimulant; tonic.
Centaureum	Bitter	General tonic; might be used oftener than it is.
Cetraria	Demulcent; bitter	Only in chronic atonic coughs.
Chimaphila	Diuretic (?)	Only in scrofula.
Chiretta	Disagreeable; bitter	General tonic.
Cinchona (pale)	Slightly aromatic	„
„ (red)	Less aromatic	Chiefly in ague.
„ (yellow)	„	„
Cinchonine	Probably same as quinine	„
Cod-liver oil		See Ol. Morrhuæ, p. 683.
Copalchi bark	Agreeable bitter, p. 826.	General tonic.
Cusparia	Unstimulating(?); astringent	Chiefly in later stage of fever and of dysentery.
Ferri pulvis	Peculiarly useful (?)	Chlorosis.
Gentian	Pure bitter	General tonic.
Inula	Stimulating aromatic	Not much used.
Iron, filings	„	Not used as tonics.
„ black oxide	See Ferri Oxyd. Nig.	Chlorosis, &c.
„ sesquioxide	Insoluble; bulky	Chiefly in tic douloureux.
„ sesquichloride	Not disagreeable; very efficient.	Invaluable general tonic, and in chlorosis.

Tonics — continued.

Name.	Characteristics.	Applications
Iron, iodide	Soon decomposes	In scrofula.
„ „ syrup	Keeps well	Very valuable in scrof
„ carb. sacchar.	Powerful; small doses	Children and adults: ralgias and anæmia.
„ potas. tart.	Slight taste; mild tonic	Children.
„ sulphas	Soon decomposes if dissolved	Chlorosis.
„ „ exsiccata	Much more powerful	„
„ citras	Slightly soluble	Not much used.
„ ammon. citras	Less powerful; much more easily dissolved.	Mild elegant tonic.
„ et quinæ citras	Expensive; very useful	Useful tonic.
Lupulus	Bitter	Gentle tonic in dyspep
Manganese	Natural constituent in the blood globules.	Anæmia, p. 525.
Marrubium	Mild expectorant	Atonic coughs.
Menyanthes	Diuretic	Atonic dropsies.
Narcotine	Often considered inert	Ague (*Dr. O'Shaughne*
Nux vomica	Poisonous; *small* doses	Atonic diarrhœa or pepsia.
Pareira	No sensible effect	See Buchu.
Porter	Contains iron (?); affects the head.	More powerful tonic t ale, especially for th accustomed to its use.
Pyrola	- - - - - - -	See Chimaphila.
Quassia	Pure bitter	Compatible with iron.
Quinæ disulph.	Most powerful tonic	General tonic; ague.
Quinine, amorphous	Equally useful (?); cheaper	„
Quinidine	Less powerful, cheaper	Same as quinine.
Salix	Same as cinchona; weaker	Ague.
Salicine	Same as quinine; weaker	„
Serpentary	Diaphoretic (?); stimulant	Low stage of fever; general tonic.
Simaruba	Astringent	Only in later stage of d entery.
Sinapis	Stomachic	Dyspepsia.
Strychnia	Poisonous; *small* dose	Paralysis. See p. 197.
Sumbul	Musky flavour; not peculiarly valuable as a *general* tonic (?).	Epilepsy and chorea, se 785.
Ulmus	Demulcent	See Decoct. Ulmi, p. 28
Uva ursi	No sensible effect	See Buchu.
Walnut leaves	Cheap	Scrofula.
Wines	Stimulant tonic	See Wines, p. 817.
Zinci iodidum	Not fully tested	Chorea, p. 616.

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